



AMERICAN OSTEOPATHIC
BOARD OF FAMILY PHYSICIANS

IN-SERVICE EXAM

— produced and administered by —



AMERICAN COLLEGE
OF OSTEOPATHIC
FAMILY PHYSICIANS

2024 IN-SERVICE EXAMINATION CRITIQUE BOOK

The critique book is intended as a formative tool to supplement the examination. Examinees can use the test combined with the critique book to identify the academic areas requiring further study and receive a brief explanation of the items they answered incorrectly. Items in the critique book, examination file, and key file are ordered by question number.

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Item 1

ANSWER: A

The correct answer is treat her with high-dose steroids and order a biopsy of the temporal artery. If giant cell arteritis (also known as temporal arteritis) is suspected, a diagnostic temporal artery biopsy is performed. It is important not to delay treatment while waiting for the biopsy results. Steroid treatment can be initiated up to 2 weeks before the biopsy without compromising the results. The patient with headache of giant cell arteritis requires high-dose steroids. Presentation of transient ischemic attack/stroke would include facial weakness, limb weakness, and difficulty speaking. A patient with these conditions would not have normal physical examination findings; therefore, this is not the correct answer. Although the erythrocyte sedimentation rate is frequently elevated in patients with giant cell arteritis, it is a nonspecific inflammatory marker and not diagnostic. Antinuclear antibody tests and complete blood counts have no diagnostic role in giant cell arteritis. If giant cell arteritis is suspected, steroid treatment may be started prior to laboratory evaluation with an erythrocyte sedimentation rate (nonspecific inflammatory biomarker) and biopsy. Giant cell arteritis requires high-dose steroids.

Reference: American Family Physician (Oct 2022); Vol. 106, Issue 4; Polymyalgia rheumatica and giant cell arteritis; rapid evidence review; pg. 420-426

Item 2

ANSWER: D

The correct answer is annual testing for microalbuminuria beginning at the time of diagnosis. Annual microalbuminuria testing for early kidney disease begins at diagnosis of type 2 diabetes due to frequent occurrence of end-organ damage by the time of diagnosis. Waiting 5 years from the time of diagnosis to begin annual screening for renal disease is recommended for patients with type 1 diabetes, and screening is performed via random urine microalbumin testing. Waiting until renal disease has already started does not allow for slowing progression of disease. Standard dipstick testing is not indicated, as it diagnoses kidney dysfunction at a later date than is ideal for intervention to slow or stop progression.

Reference: Diabetes Care (Jan 2017); Vol. 40, Supplement 1; 10. Microvascular complications and foot care; pg. S88-S98
Brenner & Rector's The Kidney, 10th ed. (2015); Ch. 36

Item 3

ANSWER: A

The correct answer is advise her to wear loose-fitting clothes. This patient's presentation is classic for meralgia paresthetica, or lateral femoral cutaneous nerve entrapment. The lateral femoral cutaneous nerve traverses over the inguinal ligament and can be compressed by external forces against the iliac bone. Risk factors include obesity and wearing tight-fitting clothing. Diagnosis is clinical, and further evaluation is not usually indicated in classic presentations; MRI or electromyography could be appropriate evaluations in cases that are unclear. Pharmacotherapy can be used to address symptoms, but it does not directly address the pathophysiology and would be recommended for symptom control should initial conservative management strategies fail to resolve symptoms.

Reference: Harrison's Principles of Internal Medicine, 21st ed. (2022); Ch. 446: Peripheral Neuropathy

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Item 4

ANSWER: B

The correct answer is hyperinsulinemia. In the setting of hyperglycemia and hypertriglyceridemia, the patient would also be at risk for hyperinsulinemia, as the overactivity of the pancreas to address these problems can lead to the overproduction of insulin to manage the high levels of glucose and triglycerides. This patient has metabolic syndrome, which includes hyperinsulinemia/insulin resistance in the early stages. This patient would also be at risk for type 2 diabetes. Electrolyte disturbances, such as hyperkalemia and hypokalemia, are not directly associated with this syndrome. Hyperaldosteronism is a common cause of resistant hypertension, not metabolic syndrome. Hypoinsulinemia is present in type 1 diabetes. Patients with hypoinsulinemia usually present with markedly elevated blood glucose levels, candidal infections, increased thirst, and weight loss. Often patients are not diagnosed until a coma results from elevated blood glucose levels. Hypoinsulinemia is most commonly seen in children and young adults of normal weight.

Reference: Harrison's Principles of Internal Medicine, 20th ed. (2018); Ch. 401: The Metabolic Syndrome; Etiology; Insulin Resistance

Current Obesity Reports (Jun 2017); Vol. 6, Issue 2; Hyperinsulinemia: a cause of obesity?; pg. 178-186

Item 5

ANSWER: E

The correct answer is pharmacologic stress test with radioisotope imaging. Pharmacologic stress testing is utilized when patients are unable to exercise sufficiently to reach the goal metabolic equivalents of tasks (METs). This may be the case in a patient with claudication. Exercise stress testing with echocardiography is an option for a patient who can exercise sufficiently and has no baseline ECG abnormalities and no previously noted wall motion abnormalities. Exercise stress testing with radioisotope scanning is indicated when a patient can walk sufficiently to do the test and has baseline ECG abnormalities and previously noted wall motion abnormalities. Exercise stress testing alone is indicated in low-risk patients with no baseline ECG abnormalities. Echocardiography can be performed in conjunction with pharmacologic stress testing but will not yield satisfactory results with contrast alone.

Reference: Teaching Rounds: A Visual Aid to Teaching Internal Medicine Pearls on the Wards (2016); Ch. 9: Stress Testing

Item 6

ANSWER: A

The correct answer is alcohol consumption. Breast cancer risks include female sex, advancing age, genetic predisposition, history of chest radiation, presence of dense breasts, history of breast disease, nulliparity, obesity, early age at menarche, late menopause, and alcohol use. Of the answer choices, alcohol use is the only option considered to place patients at an elevated risk, with more than 1 drink per day being considered high risk. Aspirin use has not been shown to increase breast cancer risk. Early menopause and multiparity are both shown to be associated with a decrease in risk and are therefore incorrect. Raloxifene (Evista®) is a selective estrogen receptor modulator used to prevent breast cancer via its antiestrogenic properties.

Reference: Williams Gynecology, 4th ed. (2020); Ch. 13: Breast Disease

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Item 7

ANSWER: A

The correct answer is atrial fibrillation. This ECG reveals a variable heart rate and absence of P waves. This is consistent with atrial fibrillation. Although the ECG reveals tachycardia, there are no P waves; therefore, this rhythm is not sinus tachycardia. Normal sinus rhythm is incorrect given the absence of P waves and the variable tachycardia. A third-degree heart block is characterized by a complete dissociation of atrial and ventricular beats and typically presents with QRS complexes being conducted at their own rate (escape rhythm), totally independent of the P waves. Multifocal atrial tachycardia is a cardiac arrhythmia caused by multiple sites of competing atrial activity. Given the absence of visible P waves, this is not the most appropriate interpretation.

Reference: Tintinalli's Emergency Medicine: A Comprehensive Study Guide, 9th ed. (2020); Ch. 18: Cardiac Rhythm Disturbances

Item 8

ANSWER: D

The correct answer is D-dimer has a negative predictive value of 98%. Positive predictive value is the probability that subjects with a positive screening test result truly have the disease. Negative predictive value is the probability that subjects with a negative screening test result truly do not have the disease. In the example below, there were 63,695 subjects whose screening test result was negative, and 63,650 of these were, in fact, free of disease. Consequently, the negative predictive value of the test is $63,650/63,695 = 99.9\%$.

	Diseased	Not Diseased	Total
Test Positive	132	983	1,115
Test Negative	45	63,650	63,695
Column Totals	177	64,633	64,810

In the study described in the case scenario, there were 100 patients whose screening test result was negative and 98 who were actually free of disease. Therefore, the negative predictive value of the test is 98%. Likelihood ratio (LR) is the likelihood that a given test result would be expected in a patient with the target disorder compared to the likelihood that that same result would be expected in a patient without the target disorder. The LR is used to assess how good a diagnostic test is and to help in selecting an appropriate diagnostic test or sequence of tests. Positive LR (LR+) is calculated with the following formula: $LR+ = \text{sensitivity}/(1 - \text{specificity})$. Negative LR (LR-) is calculated with the following formula: $LR- = (1 - \text{specificity})/\text{sensitivity}$. Sensitivity is the number of true positives that are correctly identified as positive. Specificity is the number of true negatives that are correctly identified as negative. The case scenario does not provide the number of true positives; therefore, sensitivity, positive predictive values, and LRs cannot be calculated.

Reference: http://sphweb.bumc.bu.edu/otlt/MPH-Modules/EP/EP713_Screening/EP713_Screening5.html

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Item 9

ANSWER: D

The correct answer is hepatitis B surface antibody. HBV DNA is used in order to identify early, acute, or active infections with hepatitis B. Hepatitis B IgM and IgG core antibody (IgM and IgG anti-HBc) tests are useful only in patients who have been exposed to the hepatitis B virus. IgM would indicate an acute infection, while IgG would indicate a chronic infection. Hepatitis B surface antigen (HBsAg) is also positive only in those who have been infected by the virus. Immunization produces only a positive hepatitis B surface antibody (anti-HBs) result. Therefore, the most appropriate test to determine a person's immunity from immunization is anti-HBs.

Reference: Huppert's Notes: Pathophysiology and Clinical Pearls for Internal Medicine, 1st ed. (2021); Ch. 4-04: Diseases and Pathophysiology in Gastroenterology; Table 4.12

Item 10

ANSWER: A

The correct answer is overflow incontinence. This patient exhibits symptoms of overflow incontinence. This is a loss of urine associated with overdistention of the bladder. Patients report frequent or constant leakage or dribbling and a feeling of incomplete voiding. This is common in elderly men with enlarged prostates. Urge incontinence is the most common type of incontinence in older people. Patients report a strong and often immediate urge to void, followed by an involuntary loss of urine. Stress incontinence is much more common in women than men and is defined as a loss of urine associated with increases in intra-abdominal pressure (Valsalva maneuver). Functional incontinence is used to describe physical or cognitive impairments that interfere with continence even in patients with normal urinary tracts. Mixed incontinence describes various combinations of the preceding types of incontinence.

Reference: Current Medical Diagnosis & Treatment 2020, 59th ed. (2020); Ch. 4-04: Management of Common Geriatric Problems; 6. Urinary Incontinence

Item 11

ANSWER: E

The correct answer is separate refrigerators are to be used for food and medications. Separation of medication and food is governed by Occupational Safety and Health Administration (OSHA) regulations. PPD testing requirements are determined by the employee health department and are regulated by OSHA, but this would not be done quarterly. Medical waste is regulated by the health department. The type of glove worn is not regulated by OSHA. While personal protective equipment is required through OSHA, rules requiring wearing of masks are determined by the infectious disease department or infection control at each individual hospital and governed by the Centers for Disease Control and Prevention (CDC).

Reference: <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.1030>
<https://www.jointcommission.org/standards/standard-faqs/home-care/environment-of-care-ec/000001219/>

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Item 12

ANSWER: B

The correct answer is measles, mumps, rubella (MMR). Measles, mumps, rubella (MMR) is a live attenuated viral vaccine. Other live vaccines approved for administration include the oral adenovirus vaccine and the intranasal influenza vaccine (FluMist®). Diphtheria, tetanus, pertussis (DTaP) contains inactivated bacterial vaccine components. Hepatitis B (HepB) is a recombinant viral vaccine. Inactivated polio vaccine (IPV) is an inactivated virus vaccine. *Haemophilus influenzae* type B (Hib) is an inactivated bacterial vaccine.

Reference: Nelson Textbook of Pediatrics, 20th ed. (2016); Ch. 172: Immunization Practices; pg. 1245
<https://www.cdc.gov/vaccines/terms/usvaccines.html>

Item 13

ANSWER: E

The correct answer is tinea versicolor. On direct microscopic examination of tinea versicolor scales prepared with KOH, filamentous hyphae and globose yeast forms, termed "spaghetti and meatballs," are seen. KOH preparation of candidiasis visualizes pseudohyphae and yeast forms. Coral-red fluorescence of an intertriginous site confirms diagnosis of erythrasma on Wood lamp examination. Pityriasis rosea presents with a herald patch in 80% of patients. A herald patch is an oval, slightly raised plaque or patch 2 to 5 cm in diameter that is salmon-red with a fine collarette scale at the periphery; multiple exanthems may be present. Pityriasis rosea presents with a characteristic distribution where the long axes of the oval lesions follow the lines of cleavage in a "Christmas tree" pattern. On KOH preparation of tinea corporis, dermatophytes are recognized as septated, tubelike structures (hyphae or mycelia). On Wood lamp examination, greenish fluorescence is noted.

Reference: Harrison's Principles of Internal Medicine, 21st ed. (2022); Ch. 57: Eczema, Psoriasis, Cutaneous Infections, Acne, and Other Common Skin Disorders

Item 14

ANSWER: A

The correct answer is albuterol metered-dose inhaler (Ventolin®). Based on the history provided, this patient most likely has exercise-induced bronchospasm. In exercise-induced bronchospasm, one of the first-line agents for treatment is a short-acting bronchodilator as needed. Some studies suggest that an inhaled corticosteroid combined with formoterol (Symbicort®) can also be used on an as-needed basis, but this was not one of the answer choices. Of the options provided, albuterol metered-dose inhaler (Ventolin®) is the correct choice. Observation is incorrect because the patient's symptoms are limiting his physical activity and need to be addressed. There is no indication for the use of a cromolyn sodium inhaler (Intal®), fluticasone inhaler (Flovent®), or theophylline (Theo-Dur®) unless the patient has continued symptoms on a short-acting β -agonist. Therefore, these would not be the best medications for first-line treatment.

Reference: StatPearls (Updated Aug 2023); Exercise-Induced Asthma

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Item 15

ANSWER: E

The correct answer is Henoch-Schönlein purpura. Henoch-Schönlein purpura is characterized by a purplish rash caused by vascular inflammation and bleeding. Typical prodrome includes headache and fever. Abdominal and joint pain often accompanies the rash. The rash blanches, and the distribution is symmetrical, often affecting dependent body areas like the lower extremities. Treatment is supportive in mild cases. Systemic lupus erythematosus (SLE) is an autoimmune disorder typically characterized by a "butterfly" rash on the face. It is most common in patients between 10 and 50 years of age and can be associated with joint pain. The dependent, blanching rash is not typical of SLE. Septicemia may be associated with joint pains and a rash; however, the patient is generally much more acutely ill than the patient described in this scenario. Pityriasis rosea rash typically starts with a herald patch on the trunk or extremities, followed by a rash a few days to weeks later in a linear "Christmas tree" distribution. Joint pain is not typical with pityriasis rosea. The rash is usually itchy. Rocky Mountain spotted fever usually presents with headache and high fever, followed a few days later by a rash that starts on the wrists and ankles and spreads to the palms and trunk.

Reference: Nelson Textbook of Pediatrics, 21st ed. (2020); Ch. 192: Vasculitis Syndromes; pg. 1318-1320

Item 16

ANSWER: B

The correct answer is roseola infantum. Roseola infantum (exanthema subitum) is characterized by a rash that follows resolution of a high fever of 2 to 3 days' duration. It typically occurs in children 6 months to 3 years of age. Febrile seizures may occur, but the child otherwise displays benign characteristics on examination. Erythema infectiosum is caused by parvovirus B19. Symptoms include a facial rash coalescing on the cheeks (sometimes called "slapped cheek" rash), low-grade fever, and sometimes a rash over the trunk and extremities. Rubeola (measles) involves a prodrome of fever, cough, coryza, and conjunctivitis followed by a generalized maculopapular rash. It is associated with a high rate of mortality in the developing world but is rarely seen in the United States. Mumps has a prodrome of low-grade fever, myalgia, headache, and anorexia followed by unilateral or bilateral parotitis, which occurs in 70-90% of cases. Varicella-zoster virus can cause herpes zoster in immunocompromised children with a prior history of varicella. The typical rash is limited to a dermatomal region, not throughout the trunk as described here.

Reference: Nelson Essentials of Pediatrics, 8th ed. (2018); Sec. 16: Infectious Diseases; Roseola Infantum (Exanthem Subitum)
Tintinalli's Emergency Medicine: A Comprehensive Study Guide, 8th ed. (2016); Ch. 141: Rashes in Infants and Children
Harrison's Principles of Internal Medicine, 19th ed. (2015); Ch. 229: Measles (Rubeola)
Harrison's Principles of Internal Medicine, 19th ed. (2015); Ch. 231e: Mumps

Item 17

ANSWER: B

The correct answer is stress incontinence. This question describes stress incontinence. Urge incontinence occurs when bladder muscles contract at the wrong times. Often these contractions occur no matter how much urine is in the bladder (not related to abdominal pressure). Overflow incontinence occurs when the bladder is unable to empty properly, and frequent leakage of small amounts of urine occurs as a result. Functional incontinence occurs when a person does not recognize the need to go to the toilet or does not recognize where the toilet is. This results in not getting to the toilet in time or passing urine in inappropriate places. Atonic incontinence occurs when there is an absence of awareness of bladder filling and of the desire to void. This leads to overdistention of the bladder and an abnormal amount of residual urine with a tendency toward overflow incontinence.

Reference: Smith & Tanagho's General Urology, 19th ed. (2020); Ch. 30: Urinary Incontinence

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Item 18

ANSWER: E

The correct answer is hemolytic uremic syndrome. Hemolytic uremic syndrome is a condition that results from the abnormal premature destruction of erythrocytes. Damaged erythrocytes start to clog the filtering system in the kidneys, which may eventually cause the life-threatening kidney failure associated with hemolytic uremic syndrome. Most cases of hemolytic uremic syndrome develop in children after 2 to 14 days of diarrhea, often bloody, due to infection with a certain strain of *Escherichia coli*. This patient's elevated BUN and creatinine levels indicate acute renal failure associated with anemia (indicated by the hemoglobin level of 9.8 g/dL). Botulism is caused by intestinal absorption of botulinum toxin. Symptoms include muscle weakness and eventually paralysis and respiratory failure. Renal failure and anemia are not commonly associated with botulism. Viral gastroenteritis is self-limited and not associated with anemia. In severe cases, dehydration can lead to decreased urination and acute renal insufficiency requiring fluid resuscitation. Thrombotic thrombocytopenic purpura is a rare blood disorder that causes blood clots in the small vessels throughout the body. It is associated with severe hemolytic anemia and a typical purpuric rash. It is not usually associated with ingestion of food or drink. The patient's platelet count would be markedly diminished if thrombotic thrombocytopenic purpura was present. Diabetic ketoacidosis is associated with increased urination and is not associated with anemia.

Reference: Nelson Textbook of Pediatrics, 21st ed. (2020); Ch. 538: Hemolytic-Uremic Syndrome; pg. 2732-2735

Item 19

ANSWER: A

The correct answer is it can be undertaken in ambulatory settings with patients who show mild to moderate withdrawal symptoms when they are not drinking. Candidates for outpatient treatment of alcohol withdrawal should exhibit only mild to moderate withdrawal symptoms. Fewer than 20% of patients with alcohol withdrawal require hospital admission. Patients with a history of delirium tremens, alcohol withdrawal seizures, severe alcohol withdrawal, complex medical or psychiatric issues, or who are pregnant should have inpatient treatment. Long-acting benzodiazepines are recommended for the treatment of alcohol withdrawal and can be given through symptom-triggered regimens, but they may also be given as a regular fixed dose for patients who have severe alcohol withdrawal.

Reference: Current Medical Diagnosis & Treatment 2024, 63rd ed. (2024); Ch. 27-18: Alcohol Use Disorder (Alcoholism)

Item 20

ANSWER: B

The correct answer is acute cervicitis. Endometrial biopsy is performed to diagnose uterine bleeding abnormalities, most commonly in the menopausal or perimenopausal years. The biopsy is obtained through the use of an endometrial suction catheter that is inserted through the cervix into the uterine cavity. Twirling the catheter while moving it in and out of the uterine cavity enhances uptake of uterine tissue, which is aspirated into the catheter and removed. Endometrial biopsy is useful in the workup of abnormal uterine bleeding, cancer screening, endometrial dating, and infertility evaluation. Contraindications to the procedure include pregnancy, acute pelvic inflammatory disease, and acute cervical or vaginal infections. Abnormal Pap smear results should be worked up separately but are not a contraindication to endometrial biopsy. Aspirin use theoretically could cause additional bleeding, but this is not life-threatening. Uterine anteversion and retroversion may make the insertion of the endometrial catheter more challenging and may result in more failed attempts. However, uterine position is not a contraindication for performing endometrial biopsy.

Reference: Pfenninger and Fowler's Procedures for Primary Care, 4th ed. (2020); Ch. 129: Endometrial Biopsy

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Item 21

ANSWER: B

The correct answer is Crohn disease. Extraintestinal manifestations of Crohn disease and ulcerative colitis include inflammatory arthritis, joint pain, eye symptoms such as iritis or uveitis, increased prevalence of gallstones and nephrolithiasis, skin manifestations of pyoderma gangrenosum and erythema nodosum, and aphthous ulcers. Typical symptoms of celiac disease are weight loss, chronic diarrhea, abdominal distention, and growth retardation. Atypical symptoms are dermatitis herpetiformis, iron deficiency anemia, and osteoporosis. Irritable bowel syndrome is the most common cause of diarrhea in young adults without symptoms suggestive of a systemic disease. Arthritic symptoms would likely not be present. Reactive arthritis is characterized by oligoarthritis, conjunctivitis, urethritis, and mouth ulcers. It usually follows dysentery or a sexually transmitted infection. 50-80% of patients are HLA-B27-positive. As the patient's abdominal concerns developed after arthritic symptoms, reactive arthritis is incorrect; reactive arthritis would occur after the abdominal pain, not before. Whipple disease may present in a similar manner to this case, with migratory oligoarthritis preceding gastrointestinal symptoms by years. However, it does not typically feature uveitis and aphthous ulcers.

Reference: Current Medical Diagnosis & Treatment 2018, 57th ed. (2018); Ch. 15: Gastrointestinal Disorders

Item 22

ANSWER: E

The correct answer is Wolff-Parkinson-White syndrome. This patient's symptoms and ECG findings are consistent with Wolff-Parkinson-White syndrome, which is the presence of a congenital accessory electrical pathway associated with episodes of tachyarrhythmia. ECG changes include a shortened PR interval of less than 120 ms, a delta wave (slurring and low upslope of the initial QRS wave), and QRS prolongation to greater than 100 ms. These features are seen on the ECG shown in the exhibit and are not considered normal variant features. Bifascicular blocks are bundle-branch blocks (right or left) associated with fascicular (hemi) blocks; they are more complex blocks that are not demonstrated here. Lown-Ganong-Levine syndrome involves periods of supraventricular tachycardia presumably caused by atrioventricular nodal bypass. An ECG would reveal a short PR interval and normal QRS complexes. In the case of a right bundle-branch block, the terminal QRS vector is oriented to the right and anteriorly (RSR' in V₁ and QRS in V₆, typically).

Reference: Harrison's Principles of Internal Medicine, 20th ed. (2018); Ch. 244: Paroxysmal Supraventricular Tachycardias; Accessory Pathways and the Wolff-Parkinson-White Syndrome

Harrison's Principles of Internal Medicine, 19th ed. (2015); Ch. 268: Electrocardiography

Harrison's Principles of Internal Medicine, 19th ed. (2015); Ch. 276: Supraventricular Tachyarrhythmias

Item 23

ANSWER: D

The correct answer is racemic epinephrine (Asthmanefrin®). Croup can be a self-limited disease treated with humidified air and supportive care. However, if respiratory distress occurs, racemic epinephrine (Asthmanefrin®) and humidified oxygen are typically used and have the fastest onset of action, as is needed for this patient with acute respiratory distress. Steroids, intravenous or intramuscular, have a slow onset of action but are still recommended as a one-time dose in croup and should be given once the patient is stabilized. Subcutaneous epinephrine (Adrenaclick®) must first be absorbed, while racemic epinephrine (Asthmanefrin®) is delivered directly to the lungs for improvement in airflow. Albuterol (Ventolin®) has a slower onset of action than racemic epinephrine (Asthmanefrin®).

Reference: Current Diagnosis & Treatment: Pediatrics, 24th ed. (2018); Ch. 19: Respiratory Tract & Mediastinum; Viral Croup; Treatment

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Item 24

ANSWER: C

The correct answer is intranasal steroid spray. First-line treatment for nasal polyps is an intranasal steroid. An allergy referral or otolaryngology referral would be the next step if the patient did not respond to initial medical therapy, but these are not recommended for initial management. Intranasal or oral antihistamines will provide little to no benefit but may help for primary prevention. Newer treatment modalities, such as IgE treatments, may help.

Reference: StatPearls (Updated Jul 2023); Nasal Polyps
Middleton's Allergy: Principles and Practice, 8th ed. (2013); Ch. 43: Rhinosinusitis and Nasal Polyps

Item 25

ANSWER: E

The correct answer is trying a few cigarettes during adolescence doubles the risk of smoking during early adulthood. Even limited exposure to nicotine doubles the risk for smoking during early adulthood. Evidence suggests that youth are more sensitive to nicotine and feel dependence sooner than adults. Most adults who smoke began their exposure during their adolescent years. Teenage girls appear to have a higher incidence of juvenile smoking, which may be an effect of peer pressure. Children with mental health issues, including attention deficit hyperactivity disorder (ADHD), have a higher incidence of adolescent smoking.

Reference: Psychology of Addictive Behaviors (Aug 2016); Vol. 30, Issue 5; Cigarette smoking and ADHD: an examination of prognostically relevant smoking behaviors among adolescents and young adults; pg. 588-600
Korean Journal of Pediatrics (Oct 2011); Vol. 54, Issue 10; Smoking and adolescent health; pg. 401-404
https://www.cdc.gov/tobacco/data_statistics/fact_sheets/youth_data/tobacco_use/index.htm

Item 26

ANSWER: E

The correct answer is test for HCV RNA. Hepatitis C virus (HCV) RNA detection is considered confirmatory for HCV infection. It is the recommended next step after a positive or equivocal HCV antibody (anti-HCV) test result. Though abnormal liver function study results may prompt screening for HCV, neither liver function studies nor immunization against hepatitis A or B would be an appropriate next step because the diagnosis has not yet been confirmed. A liver biopsy is considered the gold standard for defining liver disease status and answering questions about appropriate therapy and surveillance, but it is not an appropriate next step in diagnosing HCV infection. Ultrasonography of the liver, specifically ultrasound-based transient elastography, is useful in assessing fibrosis stage but not in confirming the diagnosis of HCV infection. Repeating the test is not recommended, as the next step for a positive or equivocal anti-HCV test result is testing for HCV RNA.

Reference: Harrison's Principles of Internal Medicine, 19th ed. (2015); Ch. 360: Acute Viral Hepatitis

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 27

ANSWER: E

The correct answer is tilt table testing. Neurocardiogenic (vasovagal) syncope is a centrally mediated (or "reflex") fall in systemic blood pressure, which may result in orthostatic intolerance and eventually syncope (loss of consciousness and postural tone). During head-up tilt, carotid baroreceptors are activated, mediating cardiac output adjustments necessary to maintain postural tone. The specificity of tilt table testing to detect autonomic dysfunction present in vasovagal syncope nears 90%. The classic neurocardiogenic/vasovagal response is characterized by a rapid drop in blood pressure (with or without associated bradycardia). The dysautonomic response demonstrates a gradual fall in blood pressure (with little change in heart rate) that ultimately results in loss of consciousness. A postural tachycardia response consists of an increase in heart rate by more than 30/min, or a heart rate greater than 120/min during the first 10 minutes of the baseline tilt. Ambulatory blood pressure monitoring is primarily utilized when white coat hypertension is suspected. It is also useful to diagnose hypertension in older and pregnant patients but is not useful for evaluation of syncope. Evaluation of patients with syncope should include an ECG, with particular attention to QT-interval prolongation. Electroencephalography would be indicated only after negative results from a cardiac workup and tilt table testing. A Holter monitor may be necessary for evaluation of syncope in patients with recurrent syncope and normal ECG findings and tilt table test results. The implantable loop recorder is used in patients who experience syncopal symptoms regularly but not often enough to be captured by a 24-hour or 30-day external Holter monitor. This is not first-line testing for syncope.

Reference: American Family Physician (Mar 2017); Vol. 9, Issue 5; Syncope: evaluation and differential diagnosis; pg. 303-312

Item 28

ANSWER: B

The correct answer is control postprandial hyperglycemia better than regular insulin. The insulins lispro (Humalog®) and aspart (NovoLog®) are rapid-peak, short-onset insulins. They peak in 2 to 4 hours and more closely mimic the pharmacokinetics of human insulin in vivo. Postprandial sugars are better controlled with these insulins versus regular insulin, which has a slower onset of action and a longer duration of action. Lispro (Humalog®) and aspart (NovoLog®) can be used with NPH insulin therapy. Lispro (Humalog®) and aspart (NovoLog®) have a shorter duration of action than regular insulin. Lispro (Humalog®) has a half-life of 60 minutes, while regular insulin has a half-life of 86 to 141 minutes. Lispro (Humalog®) has a more rapid onset of action than regular insulin. The United Kingdom Prospective Diabetes Study (UKPDS) showed a significant and sustained decrease in the risk of cardiovascular events in patients taking metformin (Glucophage®).

Reference: Williams Textbook of Endocrinology, 14th ed. (2019); Ch. 35: Therapeutics of Type 2 Diabetes Mellitus
<https://www.rxlist.com/humalog-drug.htm>

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 29

ANSWER: E

The correct answer is topical tretinoin (Retin-A®). Medications that are effective for comedonal acne include topical retinoids, benzoyl peroxide, azelaic acid, and salicylic acid. For patients with comedonal acne who desire treatment, topical retinoids or benzoyl peroxide are suggested as first-line therapy. Patients with severe, recalcitrant, nodular acne are generally treated with oral isotretinoin (Accutane®). For patients with moderate to severe inflammatory acne with or without prominent comedonal lesions, the use of a topical retinoid, topical benzoyl peroxide, and an oral antibiotic is suggested, rather than topical agents alone. Topical antibiotics have not been found to be more effective than benzoyl peroxide and also carry the concern for developing antibiotic-resistant bacteria. Therefore, they should not be used as first-line treatment. Oral antibiotics such as tetracycline (Minocycline®) should be used for a limited course, ideally up to 18 weeks, and are not indicated as first-line treatment. Resistance develops quickly when oral antibiotics are initiated. For patients with mild to moderate inflammatory acne with or without prominent comedonal lesions, the use of a topical retinoid and/or benzoyl peroxide is suggested.

Reference: Current Medical Diagnosis & Treatment 2020, 59th ed. (2020); Ch. 6-27: Acne Vulgaris; Treatment; Topical Retinoids
Current Diagnosis & Treatment: Pediatrics, 23rd ed. (2016); Ch. 15: Skin

Item 30

ANSWER: E

The correct answer is stress fracture. Stress fractures are overuse injuries common in athletes. They are generally insidious, but they can abruptly become more painful. They are usually painless or ache dully at rest, but the pain is amplified with activity, especially prolonged activity. Cuneiform torsion dysfunctions may alter mechanics of the midfoot and disrupt the mechanics of the arches, predisposing patients to pes planus and plantar fasciitis. However, this should not be painful and would not account for the symptoms being present after rest and worsening with prolonged activity. Lisfranc dislocation is a traumatic injury of the joints between the tarsal and the metatarsals, resulting either from stumbling, tripping, or landing on the feet from a high fall. Imaging may demonstrate displacement of the bones, and surgery is frequently required if the bones are dislocated or fractures are present. Bruising is frequently evident, and walking is usually intolerable. Pes planus, or flat feet, are commonly implicated in plantar fasciitis and may distort the mechanical functioning of the arches to predispose an athlete to a stress fracture, but flat feet by themselves are not painful. They may also contribute to knee pain due to the altered relationship of the tibiofibular positions with the resulting valgus ankle position. Plantar fasciitis is usually painful after rest in the early morning, but it improves with use. This overuse syndrome may be comorbid with pes planus as well.

Reference: Essentials of Physical Medicine and Rehabilitation, 3rd ed. (2015); pg. 393-396

Item 31

ANSWER: C

The correct answer is digitalis toxicity. This ECG demonstrates biphasic T waves in V₃ through V₆; this is a common finding in digitalis toxicity. Overdose of this medication can also lead to atrioventricular conduction or sinus node depression; junctional, atrial, or ventricular premature beats or tachycardias; or ventricular fibrillation. Acute anterior wall myocardial infarction would present with ST-segment elevation in the anterior leads. Acute inferior wall myocardial infarction would be indicated by ST-segment elevation in the inferior leads. Characteristic ECG findings of hyperkalemia include peaked T waves. Pericarditis would be indicated by diffuse ST-segment elevation on an ECG.

Reference: Current Medical Diagnosis & Treatment 2017, 56th ed. (2017); Ch. 10: Heart Disease; Heart Failure
The British Journal of Cardiology (Aug 2015); Vol. 22; Digoxin and the heart; pg. 96-97
<http://en.my-ekg.com/metabolic-drugs/digoxin-ekg.html>

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 32

ANSWER: C

The correct answer is metronidazole (Flagyl®) for the patient and all sexual partners. *Trichomonas* vaginitis is a sexually transmitted infection that usually produces an odorous, greenish-colored discharge similar to yeast infections and can cause pain surrounding the vulva. It is important to treat not only the patient but also the patient's partners so that reinfection does not occur. Topical metronidazole (Metrogel®) is unable to reach therapeutic levels intravaginally and will not treat the urethra and perivaginal glands. Fluconazole (Diflucan®) is used to treat fungal infections; this is not a fungal infection.

Reference: <https://www.cdc.gov/std/treatment-guidelines/trichomoniasis.htm>

Item 33

ANSWER: C

The correct answer is hypoglycemia. Hypoglycemia in neonates is a common occurrence and is more frequently seen with macrosomia. It is important to recognize and correct this condition in neonates who appear to be declining. Congenital cardiac abnormalities will present differently depending on the defect and whether it is causing a right-to-left or left-to-right shunt. They are less common than hypoglycemia and would not cause a rapid decline as illustrated in this case. Down syndrome may have associated cardiac defects that would cause initial or later onset of symptoms. Sepsis would present with initial distress (causing a lower initial Apgar score) or patient decline with the onset of sepsis. The majority of infants with hypothyroidism appear normal at birth, and 10% are diagnosed based on clinical features, which include prolonged jaundice, feeding problems, hypotonia, enlarged tongue, delayed bone maturation, and umbilical hernia. Importantly, permanent neurologic damage results if treatment is delayed.

Reference: Harrison's Principles of Internal Medicine, 21st ed. (2022); Ch. 383: Hypothyroidism
Nelson Textbook of Pediatrics, 21st ed. (2020); Ch. 111: Hypoglycemia; pg. 850-862
Nelson Textbook of Pediatrics, 21st ed. (2020); Ch. 127: The Endocrine System; pg. 983-985
Pathology: The Big Picture (2008); Ch. 10: Cardiac Pathology

Item 34

ANSWER: C

The correct answer is zoledronic acid (Reclast®). A calcium level of greater than 14.0 mg/dL is marked as hypercalcemia and is considered to be caused by malignancy until proven otherwise. The patient in this scenario has a calcium level of 17.4 mg/dL along with symptoms of lethargy/stupor due to the acute onset of severe hypercalcemia. Emergency treatment of hypercalcemia consists of intravenous hydration, administration of a loop diuretic to block reabsorption of calcium from the loop of Henle, and administration of a bisphosphonate or calcitonin to block reabsorption of calcium from the bones. Thiazide diuretics should be avoided because they increase reabsorption of calcium. Hyperparathyroidism is the most common cause of mild hypercalcemia. The most common malignancy causing hypercalcemia is multiple myeloma; however, 20-40% of cancer patients develop hypercalcemia. This usually indicates a worsening prognosis. Zoledronic acid (Reclast®) is a bisphosphonate indicated for the treatment of hypercalcemia. None of the other medications reduce calcium levels. Benazepril (Lotensin®) is an angiotensin-converting enzyme inhibitor used to treat hypertension. Dobutamine (Dobutrex®) is an inotropic agent primarily used to treat acute heart failure. Indapamide (Lozol®) is an indole diuretic. It is not a loop diuretic and is therefore not helpful for treatment of hypercalcemia. Mexiletine (Mexitil®) is an antiarrhythmic and is also not indicated for treatment of hypercalcemia.

Reference: Harrison's Principles of Internal Medicine, 20th ed. (2018); Ch. 50: Hypercalcemia and Hypocalcemia; Hypercalcemia; Treatment

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 35

ANSWER: A

The correct answer is anterior longitudinal ligament. The mechanism of injury described is forced cervical extension. The only structure listed that resists cervical extension is the anterior longitudinal ligament. The interspinous ligament, ligamentum flavum, posterior longitudinal ligament, and supraspinous ligament all resist cervical flexion, not extension, and are inconsistent with an extension injury.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 5: Biomechanics; pg. 104-134

Item 36

ANSWER: B

The correct answer is echocardiography. In the United States, aortic stenosis is the most common valvular abnormality. Symptoms seen in patients with aortic stenosis may range from no symptoms to heart failure, chest pain, and progressive dyspnea. The diagnostic study of choice to evaluate aortic stenosis in terms of severity is echocardiography. In patients who are considered to have mild aortic stenosis and who are not symptomatic, echocardiography is recommended every 3 to 5 years. If the aortic stenosis is moderate, echocardiography is recommended every 1 to 2 years. If the aortic stenosis is severe, echocardiography is recommended every year. The other choices provided do not evaluate the aortic valve structure and function as well as echocardiography. A cardiac CT scan specifically evaluates right ventricle and left ventricle function; a MUGA scan evaluates ejection fraction. For stress testing in a patient symptomatic for aortic stenosis, a thallium stress test is preferred over an exercise stress test but would not assess the severity of the patient's aortic stenosis. Electrocardiography shows electrical activity of the heart.

Reference: Textbook of Family Medicine, 9th ed. (2016); Ch. 27: Cardiovascular Disease

Item 37

ANSWER: C

The correct answer is ethosuximide (Zarontin®). Absence seizures are brief, 10- to 15-second generalized seizures. They have no postictal period and occur primarily in children. There is no underlying cause, but the condition does have a genetic predisposition. Most children outgrow absence seizures by adulthood. The patient's electroencephalogram shows a 3-Hz spike-and-wave pattern. Ethosuximide (Zarontin®) is the treatment of choice for absence seizures. Carbamazepine (Tegretol®) is an antiepileptic medication, but it is not used to treat absence seizures. Clonidine (Catapres®) is also not used for absence seizures. Fluoxetine (Prozac®) and methylphenidate (Ritalin®) are not seizure medications.

Reference: Current Medical Diagnosis & Treatment 2017, 56th ed. (2017); Ch. 24: Nervous System Disorders

Item 38

ANSWER: D

The correct answer is rotator cuff impingement. Because the patient does have full range of motion at all planes, with discomfort at the ends of range of motion, and does not have any bruising or deformity (which would indicate an acromioclavicular sprain), frank restriction of motion (which would indicate adhesive capsulitis or a rotator cuff tear), or neurologic symptoms (which would be present with cervical radiculopathy), rotator cuff impingement would be the most likely diagnosis.

Reference: Textbook of Family Medicine, 9th ed. (2016); Ch. 30: Common Issues in Orthopedics; pg. 653-657

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 39

ANSWER: A

The correct answer is appropriate for patients with either systolic or diastolic dysfunction. There is evidence that angiotensin receptor blockers (ARBs) are indicated for the treatment of both systolic and diastolic heart failure in patients intolerant to angiotensin-converting enzyme inhibitors. ARBs have been shown to reduce hospitalization and improve symptoms in patients with diastolic heart failure but did not reduce overall mortality. The use of ARBs in patients with systolic heart failure has been shown to reduce cardiac death and hospitalizations. However, they do have some significant adverse reactions, such as hypotension, renal insufficiency, and hyperkalemia. Therefore, it is incorrect to say that ARBs are appropriate only for patients with a decreased ejection fraction and that they should be avoided in patients with diastolic dysfunction. The presence of both hypertension and heart failure is an indication for ARB usage, but they can be used in patients with heart failure even in the absence of overt hypertension. Lower doses should be used in this case, and the physician should monitor for hypotension. Cor pulmonale, or right ventricular heart failure, is caused by primary lung disease. The underlying lung disease should be treated, but if heart failure is present, it is treated as any diastolic heart failure would be treated.

Reference: Circulation (May 2022); Vol. 145, Number 18; 2022 AHA/ACC/HFSA guideline for the management of heart failure: a report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines
Harrison's Principles of Internal Medicine, 20th ed. (2018); Ch. 253: Heart Failure: Management

Item 40

ANSWER: B

The correct answer is 6 to 12 weeks old. The incubation period for rotavirus (RV) diarrhea is short, usually less than 48 hours. The clinical manifestations of infection vary and depend on whether it is the first infection or reinfection. The first infection after 3 months of age is generally the most severe. Infection may be asymptomatic, cause self-limited watery diarrhea, or result in severe dehydrating diarrhea with fever and vomiting. Up to one-third of infected children may have a temperature greater than 39.0°C (102.2°F). RV infection in infants and young children can lead to severe diarrhea, dehydration, electrolyte imbalance, and metabolic acidosis. The Advisory Committee on Immunization Practices (ACIP) recommends routine RV vaccination of all infants without a contraindication. The vaccine should be administered as a series of either 2 (at 2 and 4 months of age) or 3 (at 2, 4, and 6 months of age) oral doses for RV1 and RV5, respectively. The vaccination series for both vaccines may be started as early as 6 weeks of age. None of the other dates listed coincide with ACIP guidelines. In addition, no RV vaccine should be administered to infants older than 8 months of age, eliminating 1 year and 15 months of age as possible correct answers.

Reference: <https://www.cdc.gov/rotavirus/vaccination.html>
<https://www.cdc.gov/vaccines/pubs/pinkbook/downloads/rota.pdf>

2024 IN-SERVICE EXAMINATION CRITIQUE BOOK

Item 41

ANSWER: D

The correct answer is ketoconazole (Nizoral[®]). Seborrhea is a very common chronic dermatosis characterized by redness and scaling that occurs in regions where the sebaceous glands are most active, such as the face and scalp, the presternal area, and the body folds. Mild scalp seborrheic dermatitis causes flaking, i.e., dandruff. It is thought that *Malassezia furfur* may play a pathogenic role. Shampoos containing selenium sulfide, zinc pyrithione, and/or tar are useful. 2% ketoconazole shampoo is very effective; lather can be used on the face and chest while showering. Low-potency glucocorticoid solutions, lotions, or gels can be used after a medicated shampoo for more severe cases. Adapalene (Differin[®]) is used for acne treatment. While topical steroids like betamethasone (Diprosone[®]) can be used in combination with antifungals like ketoconazole, they are not used as standalone treatment. Clindamycin (Cleocin T[®]) is used for acne treatment and is not effective for seborrhea. Pimecrolimus (Elidel[®]) is used for atopic dermatitis and can be helpful for seborrhea, but it is not first-line therapy.

Reference: Harrison's Principles of Internal Medicine, 21st ed. (2022); Ch. 57: Eczema, Psoriasis, Cutaneous Infections, Acne, and Other Common Skin Disorders
Fitzpatrick's Dermatology in General Medicine, 8th ed. (2012); Sec. 2: Eczema/Dermatitis

Item 42

ANSWER: E

The correct answer is Pap smears are not indicated. The patient described (monogamous, limited number of partners, no abnormal Pap smear results) has an extremely low risk for cervical cancer. In addition, cervical cancer generally occurs at the squamocolumnar junction, which was presumably removed during the patient's total hysterectomy. Therefore, a Pap smear would not be indicated. Currently, screening guidelines for women 21 to 65 years of age recommend a Pap smear every 3 years. Women 30 to 65 years of age can have Pap smears every 5 years if cotesting is performed and the results are negative (meaning even if a Pap smear shows normal cells, testing for human papillomavirus is conducted to assess if the patient is positive or negative for high-risk strains). Pap smears should not be conducted on women less than 21 years of age or women over 65 years of age. These are the most current guidelines as of 2018 according to the U.S. Preventive Services Task Force (USPSTF).

Reference: <https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/cervical-cancer-screening>
<https://www.cancer.gov/types/cervical/screening>

Item 43

ANSWER: D

The correct answer is prolactinoma. Prolactinomas account for about half of all functioning pituitary tumors. These are more common in women but also occur in men. The most common presenting symptoms are amenorrhea, galactorrhea, and infertility. Men may present with impotence, loss of libido, infertility, or signs of central nervous system compression (headache and visual defects). Anorexia nervosa may present with amenorrhea and infertility, but galactorrhea is not a presenting symptom for anorexia nervosa. Galactorrhea may be a presenting symptom of fibrocystic breast disease, but it is not associated with amenorrhea or infertility. Hypopituitarism would also include symptoms of hypothyroidism, such as fatigue, weight gain, dry skin, etc. Stress-induced amenorrhea is usually associated with stressful life events, such as leaving for college or taking a test. Stress-induced amenorrhea usually causes 1 to 2 missed cycles or a delay in onset of menses, not prolonged amenorrhea.

Reference: Harrison's Principles of Internal Medicine, 20th ed. (2018); Ch. 373: Pituitary Tumor Syndromes; Hypothalamic, Pituitary, and Other Sellar Masses; Prolactinoma

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 44

ANSWER: B

The correct answer is brachial plexus stretch injury. Brachial plexus injury involving the upper plexus (C5-C6) is known as Erb palsy. This presents with weakness of the deltoid and supraspinatus muscles and may involve the infraspinatus and teres minor. Sensation will be affected over the deltoid muscle. Biceps tendonitis presents with pain while flexing the arm. Tenderness is palpated at the bicipital groove. Deltoid pain is found over the body of the muscle and the posterior glenoid area. Impingement syndrome usually presents with pain with abduction and elevation of the arm above the level of the shoulder or flexion to 90 degrees with internal rotation. It also would not have any associated neurologic findings such as paresthesia or weakness. Tenderness is usually found on the subacromial bursa. Rotator cuff strain presents with pain on abduction and elevation. The pain is usually continuous, and the patient may have weakness of the supraspinatus and be unable to hold the arm in abduction.

Reference: Current Medical Diagnosis & Treatment 2023, 62nd ed. (2023); Ch. 24-34: Brachial & Lumbar Plexus Lesions

Item 45

ANSWER: E

The correct answer is tenderness to palpation of the posterior lateral malleolus. The Ottawa Ankle Rules state that an ankle radiographic series is required if there is pain in the malleolar region with specific additional findings, one of which is tenderness of the posterior lateral malleolus. Ecchymosis around the lateral malleolus alone does not necessitate a radiographic study of the ankle. A positive drawer test result would indicate an ankle sprain and not a potential fracture. A positive squeeze test result is indicative of a possible high ankle sprain and not a fracture. A positive talar tilt test result would also more likely be indicative of an ankle sprain and not a fracture.

Reference: Rosen's Emergency Medicine: Concepts and Clinical Practice, 9th ed. (2017); Ch. 58: Ankle and Foot; pg. 726

Item 46

ANSWER: A

The correct answer is complete history and physical examination. The diagnosis of Parkinson disease is made primarily by a thorough clinical evaluation. There are no specific tests that are used to diagnose Parkinson disease. In this case, the patient's progressive resting tremor and slowing movement are consistent with Parkinson disease. An MRI of the brain may sometimes distinguish between idiopathic Parkinson disease and other conditions that present with signs of parkinsonism, but it is not the most appropriate next step. A CT scan of the head has almost no role in investigations. Likewise, a lumbar puncture and electroencephalography will also not contribute any useful information to help diagnose Parkinson disease.

Reference: Harrison's Principles of Internal Medicine, 21st ed. (2022); Ch. 435: Parkinson's Disease
Current Diagnosis & Treatment: Geriatrics, 2nd ed. (2014); Ch. 24: Parkinson Disease & Essential Tremor; Clinical Findings
Hazzard's Geriatric Medicine and Gerontology, 7th ed. (2014); Ch. 67: Parkinson Disease and Related Disorders

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 47

ANSWER: D

The correct answer is patient's prognosis must be 6 months or less. The primary criteria for a patient to be eligible for hospice is to be determined to have a terminal illness, which is defined as having a prognosis of 6 months or less if the disease or illness runs its normal course. Two physicians must certify that the patient has a prognosis of 6 months or less if the disease runs its usual course. Prognoses are probabilistic by their nature; patients are not required to die within 6 months but rather to have a condition from which half the individuals with it would not be alive within 6 months. Patients sign a hospice enrollment form that states their intent to forgo curative services related to their terminal illness, but they can still receive medical services for other comorbid conditions. Patients also can withdraw enrollment and reenroll later; the hospice Medicare benefit can be revoked later to secure traditional Medicare benefits. No specific therapy is excluded, and the goal is for each therapy to be considered for its symptomatic (as opposed to disease-modifying) effect. Do-not-resuscitate orders, although commonplace, are not a requirement for payment for hospice. Two physicians need to certify the prognosis, but no specific requirement of referral by a primary care physician is made. Likewise, hospice care can be implemented in a group home, extended care facility, patient's own home, etc.

Reference: Harrison's Principles of Internal Medicine, 19th ed. (2015); Palliative and End-of-Life Care

Item 48

ANSWER: B

The correct answer is lymphatic drainage. Lymphatic drainage is a treatment modality that optimizes dysfunction of the lymphatic system. The lymphatic system plays a major role in numerous homeostatic mechanisms, such as transporting fats to the blood from digestive processes, facilitating immune function, and assisting the body in removing interstitial tissue fluid and plasma proteins that accumulate as a result of tissue metabolism, inflammation, infection, trauma, or system dysfunction. In general, the correct sequence for treatment involves beginning centrally and addressing myofascial pathways like the thoracic inlet, thoracic diaphragm, pelvic diaphragm, popliteal diaphragm, etc. After this, the operator can move on to fluid pumps such as thoracic pumps but may also include effleurage with a goal of mobilizing fluid through the now open central myofascial pathways. At the conclusion, the operator should consider addressing spinal involvement or addressing other residual somatic dysfunctions at the encounter. In this patient, treatment of the anterior cervical soft tissues serves to improve function through the central myofascial pathways, particularly the anterior and posterior cervical lymph node chains, improving lymphatic drainage from the head and neck and thereby improving recovery from infections impacting the upper airway. Chapman reflex is incorrect. Chapman reflexes for the upper and lower lung are parasternal rib spaces 3 and 4 and T3-T4 transverse processes posteriorly. These are not impacted directly by thoracic inlet release. Parasympathetic somatovisceral reflexes is incorrect. Parasympathetic release would focus more on upper cervicals for respiratory disease states. Scalene muscles is incorrect. Scalene muscles require more active engagement of the cervical spine to mediate release of these muscles. Sympathetic somatovisceral reflexes is incorrect. While sympathetic innervation for the lungs emerges from T3-T4, this is below the level expected to respond to thoracic inlet release.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); pg. 915-918

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CRITIQUE BOOK**

Item 49

ANSWER: C

The correct answer is T10-L2. The heavy menstrual bleeding described is most likely due to uterine leiomyomas or dysfunctional uterine bleeding. Both are pathologies affecting the uterus primarily. Endometriosis is less likely. The uterus receives its sympathetic innervation from the T10-T12 nerve roots, primarily T10 bilaterally, making this the correct answer. C2-C3 represent the vagus nerve, which only carries parasympathetic innervations. T5-T8 innervates the upper gastrointestinal tract only. L3-S1 does not provide any sympathetic innervation. S2-S4 provides parasympathetic tone to the uterus, cervix, and genital tracts, as well as afferent information distally and from the cervix, while the uterus afferents all travel through the thoracolumbar segments.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 47B: Gynecology
Somatic Dysfunction in Osteopathic Family Medicine, 2nd ed. (2015); Ch. 7: Viscerosomatic Reflexes and Somatovisceral Influences; Table 7.1

Item 50

ANSWER: D

The correct answer is T10-L2. T10-L2 provides sympathetic input to most of the structures in the pelvis. The uterus, cervix, ovaries, and salpinx receive this sympathetic input, along with mixed parasympathetic tone from the vagus and primarily pelvic splanchnic nerves. C2-C4 may impact the vagus nerve (parasympathetic innervation). C2-C4 may also involve the superior cervical ganglion, which supplies sympathetic innervation to the head. These segments are unlikely to impact the salpinx through sympathetically mediated reflexes. T1-T5 is responsible for cardiac and pulmonary involvement but is unlikely to impact the salpinx. T6-T9 provides sympathetic innervation for the upper gastrointestinal system related to the greater splanchnic nerve and celiac plexus (ganglion). It is unlikely to impact the salpinx through sympathetically mediated reflexes. S2-S4 gives rise to the pelvic splanchnic and the sacral splanchnic nerves. As this provides mixed sympathetic/parasympathetic tone to the salpinx, ovaries, and uterus, it does not represent the best answer.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); pg. 259
Somatic Dysfunction in Osteopathic Family Medicine, 2nd ed. (2015); Ch. 13: Gynecology/Viscerosomatic Reflexes

Item 51

ANSWER: E

The correct answer is warfarin (Coumadin®). Cardioembolism causes 20% of ischemic strokes. They are caused by an embolism of thrombotic material formed on the atrial or ventricular walls or left valves of the heart. Emboli from the heart most often lodge in the internal carotid artery, middle cerebral artery, and posterior cerebral artery. The most common cause of cardioembolic stroke is atrial fibrillation. Other causes include rheumatic heart disease, mitral valve prolapse, congenital valve defects, hypertrophic obstructive cardiomyopathy, and ischemic cardiomyopathy. Treatment is anticoagulation. Therefore, the correct answer is warfarin (Coumadin®), which is an anticoagulant medication. Aspirin (Ecotrin®) and clopidogrel (Plavix®) are antiplatelet medications, not anticoagulant medications. Rivaroxaban (Xarelto®) is a newer anticoagulant medication approved for the treatment of nonvalvular atrial fibrillation. The cause for this stroke is from mitral valve disease, so rivaroxaban (Xarelto®) would not be an appropriate treatment. Propranolol (Inderal®) is a β -blocker, which is not used specifically for stroke prevention.

Reference: Harrison's Principles of Internal Medicine, 19th ed. (2015); Ch. 276: Supraventricular Tachyarrhythmias
Harrison's Principles of Internal Medicine, 19th ed. (2015); Ch. 445: Cerebrovascular Diseases

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CRITIQUE BOOK**

Item 52

ANSWER: E

The correct answer is nonalcoholic fatty liver disease. This patient's history is most consistent with nonalcoholic fatty liver disease. Risk factors for nonalcoholic fatty liver disease include obesity, metabolic syndrome, and type 2 diabetes. This patient has the risk factor of obesity. Her transaminase levels are nearly 2 to 3 times the upper limit of normal, which is common in nonalcoholic fatty liver disease. Occasional alcohol use does not usually cause alcoholic liver disease. In alcoholic liver injury (both acute and chronic), the aspartate aminotransferase level is higher than the alanine aminotransferase level, which is not the case in this patient. In acute hepatitis, one would expect to find a greater than 10-fold increase in alanine aminotransferase, which is not present in this patient. A positive hepatitis C antibody (anti-HCV) test result with confirmatory RNA titer is needed to diagnose hepatitis C. In intrahepatic cholestasis, one would expect to find at least a 3-fold elevation of alkaline phosphatase associated with a less than 10-fold increase in alanine aminotransferase. This patient does not have a 3-fold elevation of any of the liver markers. Gilbert disease causes an isolated elevation of bilirubin, which is not present in this patient.

Reference: American Family Physician (Dec 2017); Vol. 96, Issue 11; Mildly elevated liver transaminase levels: causes and evaluation; pg. 709-715

Item 53

ANSWER: D

The correct answer is observation. This patient is complaining of "growing pains" or benign nocturnal limb pains of childhood. This most commonly affects children between 4 and 8 years of age, predominantly affecting the anterior thigh and calf. The child will describe aching that occurs in the late afternoon and evening and awakens them from sleep. Physical examination will reveal normal findings and an unimpaired gait. Treatment focuses on reassurance, education, and healthy sleep hygiene. Growing pains are considered a benign, self-limited condition and require no recommended workup. Radiography is not indicated when no bony pain or difficulty with ambulation is elicited. Results from laboratory studies for growing pains will be normal; therefore, complete blood count, antinuclear antibody testing, and erythrocyte sedimentation rate are not indicated. These tests would only be indicated if autoimmune or inflammatory arthritis were suspected.

Reference: Sports Health (Mar-Apr 2017); Vol. 9, Issue 2; Growing pains; pg. 132-138

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 54

ANSWER: C

The correct answer is pityriasis rosea. This scenario describes the herald patch and the resulting rash of pityriasis rosea. This is a classic clinical description of this illness. Erythema infectiosum is a mild febrile illness with a rash caused by parvovirus. Pityriasis alba is characterized by the presence of ill-defined, scaly, faintly erythematous patches. These lesions eventually subside, leaving hypopigmented areas that then slowly return to normal pigmentation. Tinea corporis is a fungal infection and often begins as a pruritic, circular or oval, erythematous, scaling patch or plaque that spreads centrifugally. Central clearing follows, while the active advancing border, a few millimeters wide, retains its red color and can be seen to be slightly raised with cross lighting. The result is a lesion shaped like a ring (annular), from which the disease derives its common name, ringworm. A potassium hydroxide (KOH) preparation will show the segmented hyphae and arthrospores characteristic of all dermatophyte infections. Tinea versicolor (i.e., pityriasis versicolor) is a common superficial fungal infection. Patients with this disorder often present with hypopigmented, hyperpigmented, or erythematous macules on the trunk and proximal upper extremities.

Reference: Harrison's Principles of Internal Medicine, 21st ed. (2022); Ch. 57: Eczema, Psoriasis, Cutaneous Infections, Acne, and Other Common Skin Disorders

Fitzpatrick's Dermatology in General Medicine, 8th ed. (2012); Ch. 42: Pityriasis Rosea

Item 55

ANSWER: E

The correct answer is ultrasonography. Ultrasonography has a sensitivity of 95% and a specificity of 100% for the detection of abdominal aortic aneurysm (AAA); additionally, it is a noninvasive, inexpensive study that does not expose the patient to radiation or risk of contrast adverse effects. Angiography would be used to examine any existing AAA more closely or potentially in intervention settings; however, due to risks associated with dye load and the invasive nature of the test, it is not considered an appropriate screening tool. A CT scan with contrast would provide adequate visualization of any existing AAA; however, due to the risks associated with contrast and high radiation load, it is not the preferred screening test for AAA. A CT scan without contrast would not provide adequate visualization of the aorta to determine the presence and size of an AAA. An MRI is best for visualizing solid organs but would be less useful in AAA detection and evaluation.

Reference: Symptom to Diagnosis: An Evidence-Based Guide (2015); Ch. 2: Screening and Health Maintenance; Abdominal Aortic Aneurysm (AAA) Screening

<https://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/abdominal-aortic-aneurysm-screening>

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 56

ANSWER: D

The correct answer is prevents physicians and their immediate family members who have an ownership or compensation relationship with a clinical laboratory services facility from making referrals to it. The Stark Law, or the physician self-referral law, prohibits a physician from making referrals for certain designated health services payable by Medicare to an entity with which he or she (or an immediate family member) has a financial relationship (ownership, investment, or compensation), unless an exception applies. Also, the law prohibits the entity from presenting or causing to be presented claims to Medicare (or billing another individual, entity, or third-party payer) for those referred services. These services include:

- Clinical laboratory services
- Physical therapy services
- Occupational therapy services
- Outpatient speech-language pathology services
- Radiology and certain other imaging services
- Radiation therapy services and supplies
- Durable medical equipment and supplies
- Parenteral and enteral nutrients, equipment, and supplies
- Prosthetics, orthotics, and prosthetic devices and supplies
- Home health services
- Outpatient prescription drugs
- Inpatient and outpatient hospital services

The federal False Claims Act (FCA) imposes civil liability on any person who knowingly submits or causes to be submitted a false or fraudulent claim to the federal government. The Health Insurance Portability and Accountability Act of 1996 (HIPAA) required the establishment of a national Health Care Fraud and Abuse Control Program (HCFAC) under the joint direction of the Attorney General and the Secretary of the Department of Health and Human Services (HHS) acting through the Department's Inspector General (HHS/OIG). The HCFAC program is designed to coordinate federal, state, and local law enforcement activities with respect to health care fraud and abuse. The FCA prohibits presenting claims for services that were not provided as claimed.

Reference: <https://www.cms.gov/medicare/regulations-guidance/physician-self-referral>

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 57

ANSWER: A

The correct answer is confounding. Confounding bias is a threat to the validity of cohort and other observational studies. Confounding bias occurs when the risk factor for an outcome also impacts the exposure of interest. The impact on the exposure can be direct or indirect. In the scenario provided, fruit and vegetable intake has been shown to lower cholesterol, but the research does not determine if fruit and vegetable intake directly protects against coronary artery disease or if it functions indirectly by reducing cholesterol. Information bias, also called misclassification bias, occurs when the approach to collect or confirm data used in an analysis leads to inaccurate information. Information bias can take many forms, including self-reporting bias when factors like social desirability or differences in recall lead to inaccurate information. Measurement bias is a specific type of information bias that occurs when the tool used to obtain data is inaccurate. This can include surveys or questionnaires with questions that are not clear to the audience answering or when a device like laboratory equipment for measuring a biomarker is not properly calibrated. Random error is a specific type of measurement bias that occurs when the difference between the true value and measured value is not consistent. Random error occurs due to factors that are not known and often not controllable. Selection bias is a type of bias that occurs when the selection of study participants results in a sample that is not representative of the target population. Selection bias can occur when volunteers for a study differ from the target population or when the nonrespondents to a survey or questionnaire are significantly different from the respondents. Dropout and survivor bias, where participants who differ in a key way related to an outcome are more likely to leave or remain in a study, are also types of selection bias.

Reference: Epidemiology (Sep 2022); Vol. 33, Issue 5; Toward a clearer definition of selection bias when estimating causal effects; pg. 699-706

Kidney360 (Jul 2021); Vol. 2, Issue 7; Confounding in observational studies evaluating the safety and effectiveness of medical treatments; pg. 1156-1159

Journal of Multidisciplinary Healthcare (May 2016); Vol. 9; Information bias in health research: definition, pitfalls, and adjustment methods; pg. 211-217

Item 58

ANSWER: C

The correct answer is coronary artery disease. In athletes older than 35 years of age, atherosclerotic coronary artery disease accounts for as many as 75% of deaths. In athletes younger than 35 years of age, structural cardiac abnormalities are more common, with hypertrophic cardiomyopathy accounting for approximately 36% of cases and anomalous coronary artery for 17%. Aortic dissection and myocarditis are less common causes of death in athletes, specifically young athletes.

Reference: DeLee & Drez's Orthopaedic Sports Medicine, 4th ed. (2015); Ch. 15: Comprehensive Cardiovascular Care and Evaluation of the Elite Athlete

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 59

ANSWER: B

The correct answer is blood urea nitrogen-to-creatinine ratio greater than 20. Blood urea nitrogen (BUN)-to-creatinine ratio greater than 20 is correct because tubular function is normal in prerenal failure. If the BUN level is excessively high, this yields a ratio higher than 10:1, which is found in normal renal function. This answer also supports the given clinical picture, as a high BUN-to-creatinine ratio would be associated with lower urine output (resorbed in tubule due to higher urea concentration in tubule). Fraction of filtered sodium is calculated as less than 1% in prerenal failure; the given answer of 2% is indicative of postrenal causes. Granular casts are typically seen in intrinsic causes of renal failure, such as vasculitis, hypertension, sepsis, and systemic illness. Hyaline casts would be seen in urine sediment with prerenal failure. Urine osmolality in prerenal failure is greater than 500 mOsm/kg water. The urine sodium level in prerenal failure is less than 20 mEq/24 h.

Reference: Harrison "s Principles of Internal Medicine, 20th ed. (2018); Ch. 304: Acute Kidney Injury; Diagnostic Evaluation; Renal Failure Indices

Journal of the American Osteopathic Association (Jan 2009); Vol. 109, Issue 1; Acute kidney injury: new concepts in definition, diagnosis, pathophysiology, and treatment; pg. 13-19

Item 60

ANSWER: B

The correct answer is T2. The sympathetic supply to the heart comes from T1-T4. Several studies have demonstrated palpitory changes at these levels, particularly T2 in patients with cardiac conditions. C5 is not associated with viscerosomatic changes from cardiac conditions. T5 is a possible location for palpitory findings due to angina, but it is not nearly as common as T2. T10 and T12 do not contribute sympathetic supply to the heart and therefore do not demonstrate viscerosomatic-related palpitory findings.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 31

Item 61

ANSWER: D

The correct answer is perform a sterile vaginal speculum examination with pH paper testing. Diagnosis of premature rupture of membranes is based on the history of vaginal loss of fluid and confirmation of amniotic fluid in the vagina. Episodic urinary incontinence, leukorrhea, and loss of mucous plug must be ruled out. A sterile vaginal speculum examination should be performed to confirm the diagnosis, assess cervical dilation and length, and, since the patient is preterm, obtain cervical cultures and amniotic fluid samples for pulmonary maturation tests. Because of the risk of introducing infection and the usually long latency period from the time of examination until delivery, the examiner "s hands should not be inserted into the vagina of a patient who is not in labor, whether preterm or term. On sterile speculum examination, pooling of amniotic fluid in the posterior vaginal fornix can usually be seen. A Valsalva maneuver or slight fundal pressure may expel fluid from the cervical os, which is diagnostic of premature rupture of membranes. Confirmation of the diagnosis can be made by testing this fluid with nitrazine paper or placing a sample of this fluid on a slide and examining it for ferning. Urine testing would not be testing vaginal/amniotic fluid directly. Additionally, there is no indication to perform a Pap smear or cytology, as they would not provide additional information regarding premature rupture of membranes. Examination of the urine for ferning is not indicated. Examination of the slide for ferning should be performed on vaginal fluid obtained through sterile speculum examination.

Reference: Williams Obstetrics, 25th ed. (2018); Ch. 22: Normal Labor; Management of Normal Labor; Ruptured Membranes
Williams Obstetrics, 25th ed. (2018); Ch. 42: Preterm Birth; Management of Preterm Premature Rupture of Membranes

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 62

ANSWER: E

The correct answer is prior tubal infection. This patient exhibits symptoms of ectopic pregnancy with rupture. Risk factors for ectopic pregnancy include prior ectopic pregnancy, prior tubal infection, surgery for fertility restoration, or sterilization. These conditions change the anatomy of the fallopian tubes. Prior ectopic pregnancy increases the incidence by 10%, while infection increases it by 9%. The remainder of the answer options do not change the anatomy of the fallopian tubes and therefore do not increase the risk.

Reference: Williams Obstetrics, 26th ed. (2022); Ch. 12: Ectopic Pregnancy

Item 63

ANSWER: D

The correct answer is psoriatic arthritis. Psoriatic arthritis typically includes dactylitis and enthesitis. Dactylitis is characterized by sausage-shaped swelling of the fingers and toes, which is found in 29-33% of presenting patients. Enthesitis is inflammation at the insertion of a tendon or ligament to the bone, which is found in 38% of patients at presentation. The most common sites for enthesitis are the calcaneal tendon and plantar fascia; however, this may also occur at the insertions of the quadriceps and patellar tendons, iliac crest, rotator cuff, and elbow epicondyles. Gouty arthritis is usually monoarticular with swelling and pain at a single joint; hand swelling would not be present with gout of the knee. Lupus arthritis usually presents with constitutional symptoms (rash, mucosal ulcers, serositis, inflammatory polyarthritis, and photosensitivity) and does not usually reveal bony erosions. Osteoarthritis generally presents with pain in the joints that is worse with activity and stiffness with rest. Osteoarthritis does not exhibit bony erosions. Traumatic arthritis usually develops approximately 10 years after a trauma and is not associated with bony erosions.

Reference: Kelley and Firestein's Textbook of Rheumatology, 10th ed. (2016); Ch. 77: Psoriatic Arthritis

Item 64

ANSWER: E

The correct answer is there is insufficient evidence to recommend for or against routine complete skin examinations. For the general population, the U.S. Preventive Services Task Force (USPSTF) has determined that there is insufficient evidence to recommend routine screening. This recommendation is for people who do not have a history of skin cancer and who do not have any suspicious moles or other spots. The USPSTF recommends that clinicians selectively offer counseling to adults older than 24 years of age with fair skin types about minimizing their exposure to ultraviolet radiation. The American Academy of Dermatology (AAD) promotes annual skin examinations, but this is not a USPSTF recommendation. The American Cancer Society (ACS) does not recommend annual skin examinations for asymptomatic people but does recommend monthly skin self-examinations. None of the intervals provided in the other answer options are recommended by any medical society that provides guidelines.

Reference: <https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/skin-cancer-screening>

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 65

ANSWER: D

The correct answer is salicylic acid paste (Virasal[®]). Salicylic acid paste (Virasal[®]) is well tolerated in the pediatric population for the treatment of warts. Cidofovir (Vistide[®]) is used for cytomegalovirus retinitis, so it is not appropriate therapy. Imiquimod (Aldara[®]) can be used but is not used as commonly or recommended as first-line treatment. Intravesical 5-fluorouracil (Adrucil[®]) is not recommended because it is invasive and painful in this population. Surgical excision is also not recommended in pediatric patients because it is invasive and painful. Cryotherapy can also be used but is more painful and can cause blisters and scarring; it is not well tolerated in the pediatric population.

Reference: Current Diagnosis & Treatment: Pediatrics, 24th ed. (2018); Ch. 15: Skin; Virus-Induced Tumors

Item 66

ANSWER: C

The correct answer is latent autoimmune diabetes of the adult. With a history of weight loss, polyuria, and polydipsia, as well as a markedly elevated hemoglobin A1c level, the patient has diabetes. As the patient's body mass index is low, it is unlikely to be due to obesity or insulin resistance. Therefore, the patient has type 1 diabetes. As she is an adult, the best answer is latent autoimmune diabetes of the adult. Type 1 diabetes and juvenile diabetes mellitus are the same condition. Type 1 diabetes may present at any age but is most common in children before school age, with a second peak at the onset of puberty. Type 2 diabetes is more common in the adult population and is associated with insulin resistance and obesity. The patient's abrupt presentation with overt symptoms would suggest latent autoimmune diabetes of the adult rather than type 2 diabetes. There is no history of pregnancy, so gestational diabetes is incorrect. Thyrotoxicosis does not generally cause hyperglycemia.

Reference: StatPearls (Updated Jun 2022); Latent Autoimmune Diabetes
Greenspan's Basic & Clinical Endocrinology, 10th ed. (2018); Ch. 17: Pancreatic Hormones and Diabetes Mellitus; Diabetes Mellitus; Latent Autoimmune Diabetes of Adulthood (LADA)

Item 67

ANSWER: C

The correct answer is L4. A lesion involving the L4 nerve root will commonly cause weakness of the tibialis anterior and quadriceps muscles and decreased patellar reflex. Sensory deficits are usually found on the medial lower leg. L2 nerve root lesions cause weakness of the psoas and quadriceps and sensory deficits of the lateral and anterior upper thigh. There is no reflex associated with L2. L3 nerve root lesions cause weakness of the psoas and quadriceps and sensory deficits of the lower medial thigh. The patellar reflex may also be affected. L5 nerve root lesions cause weakness of the tibialis anterior, peroneus longus, and gluteus maximus. Sensory deficits are present along the lateral lower leg. There is no associated reflex. S1 nerve roots affect the gastrocnemius and gluteus maximus. Sensory deficits include the lateral foot, fourth and fifth toes, and outside of the sole. The Achilles reflex may be diminished.

Reference: Ferri's Clinical Advisor 2018, 1st ed. (2017); Hip Pain; Differential Diagnosis

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 68

ANSWER: B

The correct answer is ibuprofen (Motrin®) 800 mg 3 times daily. This patient is suffering from an acute attack of gout. Mainstays of treatment during an acute attack of gout are nonsteroidal antiinflammatory drugs, colchicine (Colcris®), or glucocorticoids; therefore, ibuprofen (Motrin®) is the correct initial treatment for this patient. Allopurinol (Zyloprim®) and probenecid (Benemid®) are utilized to prevent future gout attacks and are not utilized during an acute attack. Preventive treatment is not initiated until after a firm diagnosis of gout is made (via tapping the joint and observing crystals) or following recurrent gout attacks. Oxycodone-acetaminophen (Percocet®) may be needed if severe pain cannot be controlled but is not first-line treatment and does not address inflammation. Ice packs and rest are adjunctive to treatment with ibuprofen (Motrin®) but are not considered first-line treatment alone.

Reference: Harrison's Principles of Internal Medicine, 20th ed. (2018); Ch. 365: Gout and Other Crystal-Associated Arthropathies; Gout; Treatment

Item 69

ANSWER: E

The correct answer is smoking cessation. Longitudinal studies have shown accelerated decline in FEV₁ in a dose-response relationship to the intensity of cigarette smoking, which is typically expressed as pack-years (average number of packs of cigarettes smoked per day multiplied by the total number of years of smoking). Inhaled ipratropium bromide (Atrovent®), oral theophylline (Theo-Dur®), and oxygen therapy have roles in symptom control but not in slowing progression of disease. Inhaled corticosteroids have likewise not been shown to significantly slow progression in chronic obstructive pulmonary disease but still may help with symptoms.

Reference: Harrison's Principles of Internal Medicine, 21st ed. (2022); Ch. 292: Chronic Obstructive Pulmonary Disease

Item 70

ANSWER: D

The correct answer is prescription of olanzapine (Zyprexa®). This patient is presenting with symptoms consistent with schizophrenia, including hallucinations/delusions, disordered thinking and behavior, reduced ability to function, and neglect of personal hygiene. These symptoms respond best to antipsychotic therapy. Second-generation antipsychotics are considered first-line choices because of the more favorable adverse effect profile. Electroconvulsive therapy is indicated for severe, treatment-resistant depression or mania, or catatonia in treatment-resistant schizophrenia. None of these criteria are met by this patient. Psychotherapy can be used as an adjunct to medical therapy; however, psychotic symptoms and disordered thoughts do not usually respond to psychotherapy alone in schizophrenia. Fluoxetine (Prozac®) and venlafaxine (Effexor®) are indicated for depression and are not effective for symptoms of psychosis.

Reference: <https://emedicine.medscape.com/article/288259-treatment>

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CRITIQUE BOOK**

Item 71

ANSWER: B

The correct answer is causes recurrent visual hallucinations. Recurrent visual hallucinations are very common in Lewy body dementia. Lewy body dementia does not always occur in women. It is never completely reversible; it is progressive. Most Lewy body dementia occurs after 65 years of age, so early-age onset is incorrect. Frontotemporal dementia is not associated with Lewy body dementia.

Reference: Harrison's Principles of Internal Medicine, 20th ed. (2018); Ch. 426: Dementia with Lewy Bodies; Clinical Manifestations

Item 72

ANSWER: D

The correct answer is propranolol (Inderal®) 40 mg 2 times daily. Patients who have frequent migraines, defined as more than 1 headache per week or headaches severe enough to interfere with daily routines, are candidates for daily prophylactic treatment. Propranolol (Inderal®) is an excellent first choice for migraine prophylaxis. It has been widely studied and has been proven successful in the treatment of migraine headaches. Other β -blockers can also be used, e.g., metoprolol (Toprol®) and timolol (Blocadren®). Other proven medications for migraine prophylaxis include topiramate (Topamax®) and valproic acid (Depakote®). Acetaminophen (Tylenol®), dihydroergotamine (Migranal®), ibuprofen (Advil®), and sumatriptan (Imitrex®) are all used for abortive treatment of headaches, not for daily prophylactic treatment of migraine headaches.

Reference: Textbook of Family Medicine, 9th ed. (2016); Ch. 41: Neurology; pg. 1001-1003

Item 73

ANSWER: A

The correct answer is 75-g oral glucose tolerance test between 24 and 28 weeks' gestation. All pregnant individuals are recommended to be screened for gestational diabetes between 24 and 28 weeks' gestation. Screening can be performed using a 1-step or 2-step approach. In the 1-step approach, a 75-g glucose load is administered after a fasting glucose level is obtained, and a serum glucose level is then obtained 1 hour and 2 hours after administration. A diagnosis of gestational diabetes is made when 1 or more glucose levels are elevated. More commonly in the United States, a 2-step process is used. In this process, a 50-g oral glucose challenge test is performed in a nonfasting state. No fasting glucose level is obtained in this process, so performing a fasting finger-stick and 1-hour glucose tolerance test between 24 and 28 weeks' gestation is incorrect. Obtaining a hemoglobin A1c level or random finger-stick blood glucose level is not recommended for screening for gestational diabetes. A 3-hour 100-g glucose tolerance test is used in the 2-step process only if the 50-g oral glucose challenge test result is abnormal.

Reference: JAMA (Aug 2021); Vol. 326, Issue 6; Screening for gestational diabetes: US Preventive Services Task Force recommendation statement; pg. 531-538

Harrison's Principles of Internal Medicine, 21st ed. (2022); Ch. 479: Medical Disorders During Pregnancy

Diabetes Care (Jan 2013); Vol. 36, Supplement 1; Executive summary: standards of medical care in diabetes—2013; pg. S4

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 74

ANSWER: D

The correct answer is paroxetine (Paxil®). Paroxetine (Paxil®) and sertraline (Zoloft®) are the only 2 medications with an indication to treat posttraumatic stress disorder (PTSD). PTSD is characterized by remaining "stuck" in an extreme emotional response after a traumatic event. Alprazolam (Xanax®) is indicated for panic disorder but is not efficacious in treating PTSD. Aripiprazole (Abilify®) is an atypical antipsychotic and can be used to augment depressive medications in severe depression or for treatment of schizophrenia. Antipsychotics are not indicated as first-line treatment of PTSD. Duloxetine (Cymbalta®) is indicated for treatment of depression and fibromyalgia but has not received indication for treatment of PTSD. Risperidone (Risperdal®) is an atypical antipsychotic and is not indicated for treatment of PTSD.

Reference: Conn's Current Therapy 2018, 1st ed. (2017); Anxiety Disorders

Item 75

ANSWER: D

The correct answer is mammogram screening through age 74, and Pap smear screening is no longer recommended. The U.S. Preventive Services Task Force (USPSTF) recommends biennial mammogram screening in women up to 74 years of age. The USPSTF also recommends screening for cervical cancer in women 21 to 65 years of age with a Pap smear (cytology) every 3 years or, for women 30 to 65 years of age who want to lengthen the screening interval, screening with a combination of a Pap smear and human papillomavirus testing every 5 years. Pap smears are not recommended for patients older than 65 years who have been adequately screened. This patient has been adequately screened, and she has had several Pap smears with normal results since her abnormal Pap smear. She therefore should receive breast cancer screening, but she no longer requires Pap smears.

Reference: <https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/breast-cancer-screening>
<https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/cervical-cancer-screening>

Item 76

ANSWER: D

The correct answer is leg length discrepancy. An increase in running places additional strain on a leg length discrepancy. The more the patient walks or runs, the worse the pain gets. This patient has likely had the discrepancy for a long time without pain until the increase in exercise. Leg length discrepancies cause sacral unleveling, which requires compensatory changes to maintain balance. These changes can become deranged over time. Cauda equina syndrome would present with symptoms of saddle anesthesia, radicular pain or paresthesia, and loss of bowel and/or bladder sensation. Increased lumbar lordosis would place the sacrum at a steeper angle but should not independently cause so much pain. Midline pain may suggest a spondylolisthesis. Increased thoracic kyphosis will increase generalized back strain. It should not localize to one side. Spinal scoliosis is a possibility and can be comorbid with leg length inequalities. However, the lack of exaggerated curves on imaging does not suggest this.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); pg. 700-709

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 77

ANSWER: B

The correct answer is cyclic progesterone. Dysfunctional bleeding with endometrial hyperplasia without atypia can be treated with cyclic progesterone. Estrogen is not indicated because the patient still has a uterus. Combination hormonal therapy is less effective and may be associated with increased adverse effects; it is not indicated because of the hyperplasia. Hysterectomy is not indicated.

Reference: Williams Gynecology, 4th ed. (2020); Ch. 33: Endometrial Cancer

Item 78

ANSWER: A

The correct answer is main side effects are nausea and irregular bleeding. Nausea and irregular bleeding are the main adverse effects of emergency contraception. Emergency contraception is available without a prescription for people 17 years of age and older. Emergency contraception methods should be started as soon as possible and within 120 hours after unprotected intercourse. Levonorgestrel-ethinyl estradiol (Levora[®]), ulipristal (ella[®], available by prescription only), and intrauterine device insertion within 5 days after 1 episode of unprotected midcycle intercourse are all choices for emergency contraception. Pregnancy testing is not required prior to starting emergency contraception.

Reference: Current Medical Diagnosis & Treatment 2020, 59th ed. (2020); Ch. 18-21: Contraception; Emergency Contraception

Item 79

ANSWER: C

The correct answer is most medications to control asthma are safe in pregnancy. It is safer for pregnant women with asthma to be treated with asthma medications than for them to have asthma symptoms and exacerbations. Maintaining adequate control of asthma during pregnancy is important for the health and well-being of both the mother and the fetus. Hence, asthma medications are not contraindicated. Inhaled β -agonists are category C but have been used for decades and are deemed to be safe for both mother and fetus. Short-acting β -agonists provide quick relief by relaxing smooth muscle around the airways. Montelukast sodium (Singulair[®]) is a category B long-term control medicine. It reduces swelling inside the airways and relaxes smooth muscle around the airways, and it is therefore effective at improving asthma symptoms and lung function.

Reference: Williams Obstetrics, 25th ed. (2018); Ch. 51: Pulmonary Disorders; Asthma

Item 80

ANSWER: B

The correct answer is a Pap smear with cytology and high-risk human papillomavirus (HPV) testing every 5 years. According to the American Cancer Society (ACS), for women 30 to 65 years of age, human papillomavirus (HPV) and cytology cotesting every 5 years is the preferred recommendation. Women 30 to 65 years of age should be screened every 3 years with cervical cytology alone, every 5 years with HPV testing alone, or every 5 years with cervical cytology plus HPV testing (cotesting). The only answer choice matching these options is cervical cytology every 5 years with HPV cotesting. The cotesting does not need to occur every 3 years. Cervical cytology alone would be every 3 years, not every 5 years. HPV testing alone would occur every 5 years, not every 3 years. Women 30 to 65 years of age with a uterus should continue to receive cervical cancer screening.

Reference: Current Diagnosis & Treatment: Family Medicine, 4th ed. (2015); Ch. 27: Cancer Screening in Women
<https://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/cervical-cancer-screening>

2024 IN-SERVICE EXAMINATION CRITIQUE BOOK

Item 81

ANSWER: A

The correct answer is chlamydia. Chlamydia is the most commonly contracted sexually transmitted infection in female adolescents. While the other infections are prevalent, none of them are the most common sexually transmitted infection that is reported in this age group.

Reference: Harrison's Principles of Internal Medicine, 19th ed. (2015); Chlamydial Infections
<https://www.cdc.gov/std/chlamydia/stdfact-chlamydia.htm>

Item 82

ANSWER: B

The correct answer is carvedilol (Coreg®) and lisinopril (Prinivil®). This patient's symptoms—shortness of breath with rales on lung auscultation, edema, enlarged heart with pulmonary congestion on chest radiography, ejection fraction of 40%, and improvement of symptoms with diuresis—point to a diagnosis of heart failure. American Heart Association (AHA) guidelines recommend that comorbid conditions of hypertension, lipid disorders, obesity, diabetes mellitus, and tobacco use should be addressed as part of treatment. Left ventricular hypertrophy on echocardiography points to long-standing hypertension in this patient, which should be controlled. Guidelines recommend that angiotensin-converting enzyme inhibitors should be used in all patients with a reduced ejection fraction to prevent symptomatic heart failure, even if they do not have a history of myocardial infarction (level of evidence: A), and that β -blockers should be used in all patients with a reduced ejection fraction to prevent symptomatic heart failure, even if they do not have a history of myocardial infarction (level of evidence: C). Aspirin is indicated in this patient for cardiovascular prevention; however, amlodipine (Norvasc®) is a second-line agent for blood pressure control for this patient. Hydrochlorothiazide (HydroDIURIL®) would also be considered a second-line treatment for this patient. Spironolactone (Aldactone®) and digoxin (Lanoxin®) are indicated for refractory heart failure and would not be indicated in this patient. Warfarin (Coumadin®) is not a standard treatment for heart failure in the absence of other risk factors for thrombosis, and hydralazine (Apresoline®) is indicated only for refractory hypertension, which is not present in this patient.

Reference: Circulation (May 2022); Vol. 145, Number 18; 2022 AHA/ACC/HFSA guideline for the management of heart failure: a report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines

Item 83

ANSWER: A

The correct answer is no treatment is necessary at this time. Bacteriuric patients with chronic indwelling urinary catheters usually have pyuria, irrespective of symptoms. Patients with an indwelling catheter may also have pyuria without bacteriuria, as the catheter itself may cause bladder inflammation. Another potential noninfectious cause of pyuria is renal disease, such as interstitial nephritis. Thus, the presence of pyuria in urine specimens obtained from a patient with an indwelling urinary catheter does not identify symptomatic infection in a bacteriuric subject, nor is it an indication for antimicrobial therapy. In the asymptomatic patient, observation is the optimal treatment. Obtaining a urine culture for asymptomatic bacteriuria or pyuria in patients with an indwelling catheter is not recommended. The likelihood of bacterial contamination and inappropriate use of antibiotics (leading to antibiotic resistance) is high in patients with an indwelling catheter. Changing the catheter usually resolves pyuria. Because a culture is not indicated unless there is fever or other symptoms of infection, a culture should not be obtained in this patient. Empiric antibiotics such as trimethoprim-sulfamethoxazole (Bactrim®) or ciprofloxacin (Cipro®) should not be started due to the potential for producing antibiotic resistance and creating adverse effects from unnecessary medication. Treatment should be observation or changing the catheter.

Reference: Antimicrobial Resistance & Infection Control (Jul 2014); Vol. 3, Issue 23; Catheter associated urinary tract infections

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Item 84

ANSWER: E

The correct answer is leukocyte count of $20.0 \times 10^3/\text{mcL}$. This is a question about mortality in acute pancreatitis using the Ranson criteria. The patient is evaluated for morbidity risk with acute pancreatitis using the Ranson criteria at admission and again at 48 hours. The initial criteria include age greater than 55 years, leukocyte count greater than $16.0 \times 10^3/\text{mcL}$, blood glucose level greater than 200 mg/dL, lactate dehydrogenase level greater than 350 U/L, and aspartate aminotransferase level greater than 250 U/L. At 48 hours, the reassessment includes a hematocrit decrease of greater than 10%, BUN increase of greater than 5 mg/dL, calcium level of less than 8 mg/dL, base deficit of greater than 4 mEq/L, and PO_2 of less than 60 mmHg. Among these definable criteria, the clinical information provided in the question lists only the elevated leukocyte count. Anion gap is not a determinant of mortality but may reflect increased morbidity risk. The amylase and lipase levels do not correlate with disease severity. Elevated diastolic blood pressure is not an immediate mortality determinant. The Ranson criteria have been used since the 1970s, but there is debate about the system's sensitivity and specificity. Other scoring systems include the Acute Physiology and Chronic Health Evaluation II (APACHE II) and Bedside Index of Severity in Acute Pancreatitis (BISAP).

Reference: Quick Medical Diagnosis & Treatment 2023 (2023); Pancreatitis, Acute
American Family Physician (Jul 2022); Vol. 106, Issue 1; Acute pancreatitis: rapid evidence review; pg. 44-50
Ferri's Clinical Advisor 2018, 1st ed. (2018); pg. 943

Item 85

ANSWER: E

The correct answer is renal artery stenosis. Of the options, renal artery stenosis is most likely to present with sudden loss of blood pressure control later in life. Renal artery stenosis is associated with uncontrolled hypertension refractory to 3 or more medications. Coarctation of the aorta typically presents with upper extremity systolic hypertension or murmur. If the narrowing is severe, it may present in the neonatal period once the ductus arteriosus closes as low cardiac output and shock. This condition would not suddenly affect blood pressure control later in life. Cushing disease presents with hypertension, central obesity with rounding of the facies, thin extremities, hirsutism, menstrual irregularities, hypogonadism, skin fragility, ecchymoses, red-purple abdominal striae, acne, poor wound healing, hair loss, facial plethora, hyperpigmentation, psychosis, emotional lability, paranoia, and muscle wasting with proximal myopathy. Hyperaldosteronism is generally asymptomatic. Hypokalemia may be present, along with possible muscle cramping, weakness, paresthesia, hypertension, polyuria, and polydipsia. Pheochromocytoma presents with palpitations, diaphoresis, pallor, and paroxysmal hypertension.

Reference: American Family Physician (Oct 2017); Vol. 96, Issue 7; Secondary hypertension: discovering the underlying cause; pg. 453-461
Ferri's Clinical Advisor 2017, 1st ed. (2016); pg. 1091-1094.e1

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CRITIQUE BOOK**

Item 86

ANSWER: B

The correct answer is Crohn disease. Crohn disease is known to present with weight loss, severe abdominal pain, and bowel habit changes. Anorexia nervosa could certainly present with weight loss but should not involve bowel habit changes, significant abdominal pain, or occasional fevers. Food poisoning would be constant in the disease course and not ongoing for 3 months. Gastritis would not be associated with significant weight loss or constitutional symptoms. Irritable bowel syndrome is not associated with weight loss or fever.

Reference: Current Medical Diagnosis & Treatment 2017, 56th ed. (2017); Ch. 15: Gastrointestinal Disorders
Sleisenger and Fordtran's Gastrointestinal and Liver Disease, 10th ed. (2016); Ch. 115: Crohn's Disease; pg. 1990-2023

Item 87

ANSWER: E

The correct answer is observation. Surgery is currently not recommended for patients with asymptomatic cholelithiasis; thus, cholecystectomy is not indicated for asymptomatic cholelithiasis. Confirmatory ultrasonography is unnecessary and a waste of financial resources. Endoscopic retrograde cholangiopancreatography permits contrast imaging of the bile ducts. In this case, there is no concern for intraductal stones, so endoscopic retrograde cholangiopancreatography would not be indicated. A hepatobiliary scan is highly accurate for diagnosing cystic duct obstruction but has little utility in the evaluation of asymptomatic cholelithiasis.

Reference: Current Diagnosis & Treatment: Gastroenterology, Hepatology, Endoscopy, 3rd ed. (2016); Ch. 54: Gallstone Disease
<https://emedicine.medscape.com/article/175667-overview>

Item 88

ANSWER: B

The correct answer is discontinue the lisinopril (Zestril®). When evaluating hyperkalemia, the first appropriate steps are to evaluate the patient's diet and review their medications to determine a cause. This patient is taking an angiotensin-converting enzyme (ACE) inhibitor, lisinopril (Zestril®). A known adverse effect of ACE inhibitors is disruption of the renin-angiotensin-aldosterone system, resulting in hyperkalemia. Therefore, the correct answer is to discontinue the lisinopril (Zestril®). A potassium level of 5.5 mEq/L is not a critically high value; therefore, immediate therapy with dialysis or sodium polystyrene sulfonate (Kayexalate®) is not indicated. Increasing fluids is not indicated if there is no evidence of dehydration. A diuretic may cause some decrease in the serum potassium; however, diuretic use is not generally indicated for treatment of hyperkalemia. Dialysis would be indicated only if the hyperkalemia was due to severe acute or chronic renal failure.

Reference: American Family Physician (Sep 2015); Vol. 92, Issue 6; Potassium disorders: hypokalemia and hyperkalemia; pg. 487-495
<https://emedicine.medscape.com/article/240903-overview>

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 89

ANSWER: C

The correct answer is McRoberts maneuver. Since delivery is underway, efforts should first be made to deliver the infant vaginally using manual maneuvers. Therefore, immediate cesarean section and use of a vacuum extractor are incorrect. To perform the McRoberts maneuver, the maternal legs are hyperflexed, flattening the maternal spine and causing the pelvis to rotate. This is a well-recognized and successful maneuver to use to facilitate delivery of the anterior shoulder and is recommended to be tried first, as most women are already in this type of position for delivery in the United States, especially when they have an epidural in place. When combined with the Rubin I maneuver, which involves suprapubic pressure, the majority of shoulder dystocias can be successfully reduced. The Rubin I maneuver helps to reduce the biacromial diameter to aid delivery. The Gaskin maneuver involves having the laboring patient turn over and try to deliver on her hands and knees. This maneuver can be quite helpful if the patient does not have a dense epidural and can move appropriately to get into position. The Advanced Life Support in Obstetrics (ALSO) course offered by the American Academy of Family Physicians (AAFP) teaches to use the HELPER mnemonic for shoulder dystocias, which is as follows:

- H: Call for Help
- E: Evaluate for an episiotomy
- L: Legs in McRobert's maneuver
- P: Suprapubic Pressure
- E: Enter the vagina to do maneuvers (Rubin II/Woods screw/reverse Woods screw)
- R: Reduce the posterior shoulder
- R: Roll the patient onto all fours (Gaskin maneuver)

Reference: Williams Obstetrics, 26th ed. (2022); Ch. 27: Vaginal Delivery
American Family Physician (Apr 2004); Vol. 69, Issue 7; Shoulder dystocia; pg. 1707-1714

Item 90

ANSWER: B

The correct answer is gonorrhea and chlamydia. In male patients 14 to 35 years of age, epididymitis is most commonly caused by sexually transmitted *Neisseria gonorrhoeae* or *Chlamydia trachomatis* infection. In those younger than 14 years of age or older than 35 years of age, epididymitis is generally caused by infection with common urinary tract pathogens, such as *Escherichia coli*. In men who practice anal intercourse, coliform bacteria (e.g., *Escherichia coli*) are common causative pathogens, although *Haemophilus influenzae* infection has also been linked. Other pathogens that are less commonly associated with epididymitis include *Ureaplasma urealyticum*, *Proteus mirabilis*, *Klebsiella pneumoniae*, and *Pseudomonas aeruginosa*. The prodromes of HIV and herpes infections do not typically present with the symptoms described. Epididymitis secondary to *Mycobacterium tuberculosis* infection is rare but must be considered among those at high risk. Signs and symptoms of testicular torsion include sudden, severe pain in the scrotum, swelling of the scrotum, abdominal pain, nausea and vomiting, a testicle that is positioned higher than normal or at an unusual angle, painful urination, and fever.

Reference: American Family Physician (Nov 2016); Vol. 94, Issue 9; Epididymitis: an overview; pg. 723-726

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CRITIQUE BOOK**

Item 91

ANSWER: E

The correct answer is macrolides. This 5-month-old boy is presenting with fits of coughing followed by a whooping inhalation and posttussive emesis. This is most consistent with whooping cough, also known as pertussis. *Bordetella pertussis* is the pathogenic agent responsible. Pertussis is an acute respiratory tract infection that has increased in incidence in recent years. The initial catarrhal stage presents with nonspecific symptoms of malaise, rhinorrhea, sneezing, lacrimation, and mild cough. During the paroxysmal stage, severe outbreaks of coughing often lead to the classic high-pitched whooping sound patients make when gasping for breath. The paroxysmal stage is followed by the convalescent stage and resolution of symptoms. Complications vary by age, with infants more likely to experience severe complications such as apnea, pneumonia, seizures, or death. In adolescents and adults, complications are the result of chronic cough. The diagnosis depends on clinical signs and laboratory testing. Both culture and polymerase chain reaction testing can be used to confirm the diagnosis; serologic testing is not standardized or routinely recommended. Although antibiotics have not shown clear effectiveness in the treatment of pertussis, they eradicate nasal bacterial carriage and may reduce transmission rates. Macrolide antibiotics such as azithromycin (Zithromax®) are first-line treatments to prevent transmission; trimethoprim-sulfamethoxazole (Bactrim®) is an alternative in cases of allergy or intolerance to macrolides. Immunization against pertussis is essential for disease prevention. Current recommendations in the United States consist of administering 5 doses of the diphtheria and tetanus toxoids and acellular pertussis (DTaP) vaccine to children before 7 years of age, and administering a tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis (Tdap) booster between 11 and 18 years of age. Recent efforts have focused on the vaccination of adolescents and adults, with new recommendations for a single dose of the Tdap booster if it has not been previously administered. This is an illness with a bacterial, not viral, pathogenic organism, so antivirals are not appropriate. Cephalosporins are not recommended for treatment of pertussis. Fluoroquinolones are not considered first-line treatment, as antibiotic coverage has not shown clear benefit unless there are allergies or other contraindications. Immunoglobulins are not indicated in this bacterial respiratory infection. Immunoglobulins have a role in treatment of Kawasaki disease but not pertussis.

Reference: <https://www.cdc.gov/pertussis/clinical/treatment.html>

Item 92

ANSWER: A

The correct answer is intravenous levofloxacin (Levaquin®) 500 mg every 24 hours. The treatment of recurrent complicated urinary tract infections should follow recommendations for acute urinary tract infections. This patient displays symptoms of sepsis, including hypotension, fever, and elevated heart rate. This would indicate inpatient management as the best option. Intravenous fluoroquinolones are recommended for this condition. Intravenous vancomycin (Vancocin®) is a possibility, but culture results should be obtained and evaluated. The remaining answer options are oral, not intravenous, and are therefore not the most appropriate treatment.

Reference: StatPearls (Updated Jan 2023); Complicated Urinary Tract Infections

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 93

ANSWER: B

The correct answer is intravenous hydration, intravenous diazepam (Valium®), intravenous nitroprusside (Nitropress®) drip, and a cooling blanket. Intravenous hydration is appropriate because of the fluid loss from a hypermetabolic state due to cocaine use. Intravenous diazepam (Valium®) may be necessary to control seizures, and intravenous nitroprusside (Nitropress®) may be necessary if malignant elevation of blood pressure persists. A cooling blanket may be necessary if hyperthermia does not respond to intravenous hydration. Intravenous labetalol (Trandate®) is not indicated for a cocaine-induced hypertensive emergency or acute sympathetic crisis because it can result in an unopposed α blockade, which can worsen coronary vasoconstriction and increase blood pressure. Intravenous magnesium is indicated for preeclampsia but not drug-induced seizures. A warm blanket is contraindicated in hyperthermia. Intravenous phenytoin (Dilantin®) is not indicated for control of drug-induced seizures. This patient is too acutely ill to warrant observation.

Reference: Tintinalli's Emergency Medicine: A Comprehensive Study Guide, 9th ed. (2020); Ch. 57: Systemic Hypertension

Item 94

ANSWER: A

The correct answer is femoroacetabular impingement. This is the most likely presentation for femoroacetabular impingement, which usually occurs in the younger, more active patient. Decreased range of motion on FABER (flexion, abduction, external rotation) and FADIR (flexion, adduction, and internal rotation) tests is the most sensitive physical examination finding, with a sensitivity of 96-99% and 88%, respectively. Iliopsoas bursitis usually presents with anterior hip pain when extending the hip from a flexed position, often associated with intermittent catching, snapping, or popping of the hip. Osteoarthritis most commonly occurs in the older patient and presents with a constant, deep, aching pain. Osteonecrosis of the hip is more common in children. Synovitis of the hip is concerning with the presentation of acute-onset atraumatic anterior hip pain that results in impaired weight bearing.

Reference: American Family Physician (Jan 2021); Vol. 103, Issue 2; Evaluation and differential diagnosis; pg. 81-89

Item 95

ANSWER: D

The correct answer is pravastatin (Pravachol®). Hyperlipidemia is a potential adverse effect of antiretroviral therapy, specifically the protease inhibitors and nonnucleoside reverse transcriptase inhibitors. Due to the potential for drug interactions, statins must be chosen with care. Pravastatin (Pravachol®) is the statin of choice with these medications, as it does not require dose adjustment. Simvastatin (Zocor®) and lovastatin (Mevacor®) should not be used with protease inhibitors (darunavir [Prezista®], ritonavir [Norvir®]). Omega-3 fatty acids, niacin (Niaspan®), and fibrates are less effective options for treatment; statins are the drugs of choice to treat hyperlipidemia.

Reference: American Family Physician (Aug 2017); Vol. 96, Issue 3; HIV-associated complications: a systems-based approach; pg. 161-169

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CRITIQUE BOOK**

Item 96

ANSWER: E

The correct answer is undergo a screening test for diabetes mellitus at this visit. Early diagnosis provides the opportunity for intervention, and this patient demonstrates risk factors for diabetes mellitus (obesity and prior gestational diabetes), indicating that she should undergo early screening for diabetes mellitus at this visit. Having had gestational diabetes in the past, the patient is at increased risk for diabetes. She should not wait until she has completed the first trimester to test for gestational diabetes to avoid congenital anomalies that could result from hyperglycemia; therefore, the answers involving waiting until 20 weeks' gestation or 24 to 28 weeks' gestation to test are incorrect. However, it would be ill-advised to assume that the patient has hyperglycemia and treat without testing.

Reference: Williams Obstetrics, 25th ed. (2018); Ch. 57: Diabetes Mellitus; Gestational Diabetes; Table 57-12

Item 97

ANSWER: D

The correct answer is proximal cecum. Haustra are folds of mucosa that are only found in the colon from the cecum to the rectum. The haustra serve to segment the large intestine to help facilitate the mixing of residue and formation of solid stool. This finding on radiographic imaging would not be present anywhere else in the gastrointestinal system. The terminal ileum is part of the small intestine and does not have haustra. The gastroesophageal junction would not demonstrate haustra and also would be unlikely to be seen on an abdominal radiograph. The gastric mucosa and the common bile duct are not part of the large intestine and therefore would not have haustra present.

Reference: Harrison's Principles of Internal Medicine, 21st ed. (2022); Ch. 46: Diarrhea and Constipation
<https://radiopaedia.org/articles/haustral-folds>

Item 98

ANSWER: A

The correct answer is empyema. Pleural empyema presents with the indolent development of symptoms such as fever, sweats, cough, and dyspnea over a period of 1 to 3 weeks. Physical examination reveals egophony and fremitus, which are indicative of loculated fluid in the lung fields. Chest radiographs of patients with empyema most often reveal a free-flowing pleural effusion. Lung cancer is not likely given the time course, presentation with fever, and age of the patient. A chylothorax (lymphatic drainage within the thoracic cavity) may predispose one to an empyema but would not present with these symptoms initially. Rheumatoid arthritis is a potential cause of noninfectious empyema; however, this patient has no history of rheumatoid arthritis and presents with clear signs of infection. Pancreatitis can cause pleural effusions and fever, but this patient is presenting with a cough and no history of abdominal pain, nausea, or vomiting.

Reference: StatPearls (Updated Aug 2023); Empyema
Fishman's Pulmonary Diseases and Disorders, 5th ed. (2015); Ch. 127: Aspiration, Empyema, Lung Abscesses, and Anaerobic Infections

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CRITIQUE BOOK**

Item 99

ANSWER: B

The correct answer is folic acid level. This patient was noted to have macrocytic anemia on initial evaluation, and megaloblastic anemia was confirmed with the peripheral blood smear. The most common causes of megaloblastic anemia are vitamin B₁₂ and folic acid deficiencies. This patient clearly does not have a vitamin B₁₂ deficiency; thus, a folic acid level is warranted. Her diabetes medication, metformin (Glucophage®), is a clue to the possibility of an underlying folic acid deficiency as well. Testing revealed megaloblastic anemia; thus, thyroid and liver problems are ruled out (these are 2 causes of nonmegaloblastic anemias). The patient's vitamin B₁₂ level is well over 400 pg/mL, so there is no role for testing methylmalonic acid and homocysteine levels. Typically, testing of these levels is reserved for vitamin B₁₂ values between 100-400 pg/mL. A bone marrow biopsy is not warranted at this time. However, if folic acid testing reveals normal levels, it may be necessary.

Reference: Harrison's Principles of Internal Medicine, 21st ed. (2022); Ch. 99: Megaloblastic Anemias
Current Diagnosis & Treatment in Family Medicine, 3rd ed. (2011); Ch. 31: Anemia

Item 100

ANSWER: C

The correct answer is endometritis. Postpartum fever is defined as a temperature of 38.0°C (100.4°F) on any 2 of the first 10 days postpartum exclusive of the first 24 hours. Infection is the leading cause of postpartum fever in the United States; the overall postpartum infection rate is around 6%, with the incidence of planned cesarean deliveries up to 10%, and higher in unplanned deliveries. Endometritis is the most common infection in the postpartum period, followed by urinary tract infection, lower genital tract infection, wound infection, pulmonary infection, thrombophlebitis, cholecystitis, and mastitis. Postpartum endometritis is typically a polymicrobial infection of lower genital tract flora infecting the upper genital tract. The prevalence of endometritis has been greatly reduced with the standard use of antibiotic prophylaxis with cesarean deliveries. The risk of endometritis is increased by various factors, including:

- Prolonged labor
- Prolonged rupture of membranes
- Multiple vaginal examinations
- Operative vaginal delivery
- Bacterial vaginosis
- Chorioamnionitis
- Cesarean section (especially nonelective)
- Antepartum isolation of group B streptococci
- Chlamydia or mycoplasma

The criteria for diagnosis of endometritis include fever and uterine tenderness. The other answer options represent less common causes of fever in the postpartum period.

Reference: Current Diagnosis & Treatment: Obstetrics & Gynecology, 12th ed. (2019); Ch. 21: Postpartum Hemorrhage & the Abnormal Puerperium
Principles and Practice of Hospital Medicine, 2nd ed. (2012); Ch. 224

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 101

ANSWER: A

The correct answer is acetaminophen (Tylenol®). Acetaminophen (Tylenol®) is the recommended initial therapy for osteoarthritis. Since this patient has not taken any analgesic medications, acetaminophen (Tylenol®) would be the recommended first-line therapy to treat her osteoarthritic pain. Ibuprofen (Motrin®), meloxicam (Mobic®), and prednisone (Deltasone®) are not only not considered first-line therapy for osteoarthritis but would also not be the recommended treatment in this patient due to the risk of adverse gastrointestinal effects and her known past medical history of gastrointestinal reflux disease. In addition, cyclooxygenase-2 (COX-2) inhibitors are also on the American Geriatrics Society (AGS) Beers Criteria as inappropriate medications in older patients. Nonsteroidal antiinflammatory drugs and COX-2 inhibitors would not be the preferred first treatment and should be used with caution in patients with hypertension. Antiinflammatory agents such as ibuprofen (Motrin®) may be considered with gastrointestinal protective medications also in place (such as a proton pump inhibitor) as a second-line treatment if a patient does not respond to acetaminophen (Tylenol®). Tramadol (Ultram®) is a weak opioid agonist and is not recommended as first-line treatment for osteoarthritis or chronic pain. In a patient who has not taken any analgesic medications for osteoarthritis, acetaminophen (Tylenol®) is the first-line medication for treatment. It carries less gastrointestinal risks for adverse events and lower risks for sedation, falls, and addiction than the other answer choices.

Reference: Current Diagnosis & Treatment: Geriatrics, 2nd ed. (2014); Ch. 26: Osteoarthritis

Item 102

ANSWER: E

The correct answer is stop oxybutynin (Detrol®). Given the clinical scenario, stopping the oxybutynin (Detrol®) is the correct answer. Anticholinergics such as oxybutynin (Detrol®) are known to cause delirium in older patients, and stopping this medication is the most appropriate of all the choices given. Metformin (Glucophage®) is not associated with delirium, so stopping this medication is not indicated. Alprazolam (Xanax®), haloperidol (Haldol®), and quetiapine (Seroquel®) might provide short-term relief, but in the long-run they can worsen delirium and do not address the fact that this patient likely has medication-induced delirium.

Reference: Essentials of Clinical Geriatrics, 8th ed. (2018); Ch. 6: Delirium and Dementia

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CRITIQUE BOOK**

Item 103

ANSWER: B

The correct answer is it is a potential premalignant lesion that may progress to squamous cell carcinoma. Actinic keratoses are rough, scaly lesions that commonly occur on sun-exposed areas of the skin. The prevalence of the condition increases with age. Actinic keratosis may be treated for cosmetic reasons or for relief of associated symptoms, but the most compelling reason for treatment is to prevent the development of squamous cell carcinoma. Treatment options include ablative (destructive) therapies, such as cryosurgery, curettage with electrosurgery, and photodynamic therapy, or topical therapies in patients with multiple lesions. Treatment with surgical excision and cryotherapy together has not been proven to be more effective in the care of actinic keratosis than either therapy alone. Curettage, which involves mechanically scraping away abnormal tissue using a sharp curette, is a highly effective modality for treating actinic keratosis. Mohs micrographic surgery is utilized for surgical removal of malignant lesions to provide the best cosmetic result while ensuring that the margins of the lesion are clear. Topical steroids are ineffective for actinic keratosis. Topical fluorouracil is an established treatment for actinic keratosis and may be used for multiple small, superficial facial lesions. It is not typically used for solitary lesions, as ablative therapies are quicker and are curative. Fluorouracil cream is available in 5% (Efudex[®]), 1% (Fluoroplex[®]), and 0.5% (Carac[®]) formulations.

Reference: Harrison's Principles of Internal Medicine, 20th ed. (2018); Ch. A4: Atlas of Skin Manifestations of Internal Disease; Figure A4-27

Item 104

ANSWER: A

The correct answer is check the neonate's blood type and administer the Rho(D) immune globulin injection to the mother only if the neonate is Rh-positive. Rho(D) immune globulin is only needed when the mother is Rh-negative, the fetus is Rh-positive, and mixing of fetal and maternal blood occurs. Checking the neonate's blood type could prevent the need for Rho(D) immune globulin in the mother if the neonate is Rh-negative. Typically, Rho(D) immune globulin is given within 72 hours of delivery, but there may still be benefit 14 to 28 days after delivery. If the neonate is Rh-negative, the mother will not need Rho(D) immune globulin. If the neonate is Rh-positive, and even if fetal and maternal blood mixed during delivery, the mother may not have developed antibodies yet. The presence or absence of fetal cells on a peripheral blood smear does not demonstrate whether fetal and maternal blood mixed and whether Rho(D) immune globulin should be given.

Reference: Current Diagnosis & Treatment: Obstetrics & Gynecology, 12th ed. (2019); Ch. 12: Assessment of At-Risk Pregnancy

Item 105

ANSWER: C

The correct answer is increased uptake of radioactive iodine. The pathophysiology of Graves disease includes excess production of thyroid hormone. The increased production requires increased iodine uptake. Decreased uptake occurs in situations where the thyroid is inflamed and is leaking thyroid hormone (i.e., thyroiditis). There is no expected pain with administration of radioactive iodine, and there are no reported pathognomonic adverse effects such as sweating (diaphoresis) or swelling of the thyroid gland caused by radioactive iodine examination.

Reference: StatPearls (Updated Oct 2022); Thyroid Uptake and Scan
Harrison's Principles of Internal Medicine, 20th ed. (2018); Ch. 375: Thyroid Gland Physiology and Testing; Thyroid Hormone Synthesis, Metabolism, and Action; Iodine Metabolism and Transport

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 106

ANSWER: A

The correct answer is ultrasonography. Based on the information provided in this scenario, abdominal ultrasonography is the preferred initial imaging study to evaluate the patient's clinical presentation. Signs and symptoms of cholecystitis may include severe colicky pain in the right upper abdominal quadrant, pain that radiates to the right shoulder or back, tenderness over the abdomen when touched, nausea, vomiting, and fever. Signs and symptoms of cholecystitis often occur after a meal, particularly a large or fatty meal. Radiography of the kidneys, ureters, and the urinary bladder would not be helpful in this case. A CT scan of the abdomen with and without contrast, an MRI (especially with intravenous gadolinium-based contrast medium), and a hepatobiliary scan are secondary tests that can be utilized in this case.

Reference: Sabiston Textbook of Surgery: The Biological Basis of Modern Surgical Practice, 20th ed. (2016); Ch. 45
<https://acsearch.acr.org/docs/69474/Narrative/>

Item 107

ANSWER: D

The correct answer is graduated exercise program. The treatment of fibromyalgia requires a multidisciplinary approach that includes exercise, cognitive-behavioral therapy, pharmacologic management, and integrative therapies such as acupuncture or meditation. Of these, the only universally recommended treatment is a graduated exercise treatment plan. Exercise was the only management modality for fibromyalgia that was supported at 100% by the European Alliance of Associations for Rheumatology (EULAR) in 2017. Recommendations suggest aquatic exercise as an option as well as on-land strength and aerobic exercises. Patient education is also critical in the treatment of fibromyalgia. Patients should be educated to gradually start and increase their exercise programs and should be informed that while exercise may initially be painful, overall pain symptoms have been shown to improve over time. As mentioned, acupuncture and other integrative therapies should be included as part of the multidisciplinary approach to the treatment of fibromyalgia; however, there is not enough evidence regarding their efficacy to recommend universally to all patients. While psychologic counseling, specifically cognitive-behavioral therapy, has been shown to provide some relief in some fibromyalgia patients, including improvement of pain and physiologic functioning, it is more costly and difficult to obtain at times than exercise and is therefore not recommended as universally as a graduated exercise program. Current Food and Drug Administration (FDA)-approved pharmacotherapies for fibromyalgia include pregabalin (Lyrica®), duloxetine (Cymbalta®), and milnacipran (Savella®). These medications may provide relief of some fibromyalgia pain symptoms, but their effects are often transient. Opioids, muscle relaxers, benzodiazepines such as diazepam (Valium®), selective serotonin reuptake inhibitors such as fluoxetine (Prozac®), and corticosteroids are not FDA-approved treatment options for fibromyalgia and therefore would not be correct.

Reference: Current Diagnosis & Treatment: Rheumatology, 4th ed. (2021); Ch. 11: Fibromyalgia

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Item 108

ANSWER: C

The correct answer is parvovirus B19. Erythema infectiosum (fifth disease) is an acute, febrile illness with a unique exanthema that is caused by parvovirus B19. Children ages 5 to 15 years are most sensitive to an outbreak. The disease initially starts as a classic bright red rash across the cheeks in a pattern similar to a butterfly (hence the term "slapped cheek" rash) before expansion to the trunk and extremities. The rash is a diffuse erythema of closely grouped, tiny papules on an erythematous base. Herpesvirus type 1 infection typically presents with umbilicated vesicles that are extremely painful. These vesicles eventually unroof and crust over. Herpesvirus type 1 is the most common type identified in lesions of the skin and oral mucosa. Human herpesvirus 6 causes roseola infantum (exanthema subitum), a common acute febrile illness of childhood. This is characterized by a febrile period of 3 to 5 days and the appearance of a rash for 1 to 2 days. The appearance of the rash immediately following a nonspecific febrile illness is characteristic and aids in the diagnosis. It primarily affects young children between the ages of 6 months and 3 years. In impetigo, which is caused by streptococci, skin lesions may start as small, erythematous macules and papules that develop into discrete, thin-walled vesicles, which become pustular and quickly rupture. Fever and systemic signs are atypical. Varicella in normal children is characterized by a pruritic, generalized, vesicular exanthema with mild systemic manifestations.

Reference: Nelson Textbook of Pediatrics, 21st ed. (2020); pg. 1440-1450, 1699, 1703, 1708-1715, 1726

Item 109

ANSWER: E

The correct answer is this is considered normal behavior in about 50% of children. Tantrums are a behavioral response to stress and a loss of control. They are common between the ages of 12 months and 4 years, occurring about once a week in 50-80% of children in this age group. They stem from the child seeking to achieve autonomy and mastery over their environment and accomplish age-appropriate developmental tasks. Parents and caretakers can minimize tantrums by understanding the child's temperament and what they are trying to communicate. Parents must also be committed to supporting the child's drive to master their environment. Parents and physicians need to view these behaviors within the child's developmental context rather than from a negative, adversarial, angry perspective. It is recommended to not use negative terms when the tantrum is occurring. Instead, parents should point out that the child is out of control and give them praise when they regain control over the situation. Parents should try to minimize the need to say no within the home environment and limit the amount of restrictions that need to be enforced. Distraction can be used when frustration increases. Parents and caretakers should not abandon a child when a tantrum occurs; rather, they should stay nearby during the episode without intruding. Screening for attention deficit hyperactivity disorder could be a reasonable option if disruptive behavior in school or issues with learning were mentioned. Oppositional defiant disorder (ODD) is very uncommon at this age group, with typical age of onset around 6 years of age. ODD outbursts are often in reaction to a situation and are often verbal in nature, which is not consistent with this case scenario.

Reference: StatPearls (Updated Feb 2023); Temper Tantrums

Current Diagnosis & Treatment: Pediatrics, 26th ed. (2020); Ch. 3: Child Development and Behavior

Current Diagnosis & Treatment: Psychiatry, 3rd ed. (2019); Ch. 34: Attention-Deficit/Hyperactivity Disorder

Current Diagnosis & Treatment: Psychiatry, 3rd ed. (2019); Ch. 35: Oppositional Defiant Disorder and Conduct Disorder

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Item 110

ANSWER: D

The correct answer is intravenous penicillin G (Bicillin L-A®) 2 million units every 4 hours. This patient has erysipelas with systemic manifestations and should receive parenteral antibiotics that treat streptococcal infections. Therefore, the correct answer is intravenous penicillin G (Bicillin L-A®). Parenteral ciprofloxacin (Cipro®) is not indicated for erysipelas or cellulitis. Oral moxifloxacin (Avelox®) is not preferred due to cost and preference for parenteral agents in this patient. Oral azithromycin (Zithromax®) is not indicated due to the systemic manifestations of this condition. Topical mupirocin (Bactroban®) would not be appropriate in a patient with systemic symptoms.

Reference: Harrison's Principles of Internal Medicine, 20th ed. (2018); Ch. 143: Streptococcal Infections; Table 143-3

Item 111

ANSWER: A

The correct answer is acute nephritis. This patient has impetigo. Rare complications can occur, including cellulitis (nonbullous form), septicemia, osteomyelitis, septic arthritis, lymphangitis, lymphadenitis, guttate psoriasis, staphylococcal scalded skin syndrome, and acute poststreptococcal glomerulonephritis. Aseptic meningitis refers to inflammation of the meninges in which lumbar puncture results are negative with routine bacterial cultures. It is caused by viruses, mycobacteria, spirochetes, fungi, medications, and cancer malignancies. Coronary artery aneurysms are uncommon and describe a localized dilatation of a coronary artery segment more than 1.5-fold compared with adjacent normal segments. Kawasaki disease is the most common cause of coronary artery aneurysms in childhood and is the second most common cause in adults. Kawasaki disease is an acute inflammatory syndrome that may result in acute vasculitis of the coronary arteries and subsequent coronary artery dilatation and aneurysm formation. Coronary artery aneurysms occur in around 10-15% of patients during the acute phase of the disease. Kawasaki disease, coronary artery aneurysms, and arrhythmias are not associated with impetigo. Erosive arthritis is a disorder that most often involves the hands of postmenopausal women. The etiology remains obscure, but hormonal influences, metabolic disorders, and autoimmunity have been implicated. Postherpetic neuralgia may occur after a herpes zoster outbreak but does not occur following impetigo.

Reference: Review of Medical Microbiology and Immunology, 14th ed. (2016); Ch. 65: Hypersensitivity (Allergy)
American Family Physician (Aug 2014); Vol. 90, Issue 4; Impetigo: diagnosis and treatment; pg. 229-235

Item 112

ANSWER: C

The correct answer is *Staphylococcus aureus*. The major pathogen in bacterial endocarditis is *Staphylococcus aureus*. This exhibit shows an Osler node, which is a tender papulopustule located on the pulp of the finger in a patient with bacterial endocarditis caused by *Staphylococcus aureus*. While *Streptococcus bovis*, *Enterococcus* species, viridans streptococci, and HACEK group organisms can cause bacterial endocarditis, the most common pathogen is *Staphylococcus aureus*. Patients experiencing homelessness or inadequate housing and patients who use intravenous drugs are at the highest risk of acquiring infectious endocarditis.

Reference: Epidemiology & Infection (Jun 2020); Vol. 148; Numerous outbreaks amongst homeless and injection drug-using populations raise concerns of an evolving syndemic in London, Canada
<https://www.uptodate.com/contents/native-valve-endocarditis-epidemiology-risk-factors-and-microbiology>

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 113

ANSWER: D

The correct answer is compression dressings. Dressings are often used under compression bandages to promote faster healing and prevent adherence of the bandage to the ulcer. Many dressing options are available, including hydrocolloids (e.g., DuoDERM®), foams, hydrogels, pastes, and simple nonadherent dressings. A meta-analysis of 42 randomized controlled trials with a total of more than 1,000 patients showed no significant difference among dressing types. Furthermore, the more expensive hydrocolloid dressings were not shown to have a healing benefit over the lower-cost simple nonadherent dressings. Bacterial colonization and superimposed bacterial infections are common in venous ulcers and contribute to poor wound healing. However, a recent Cochrane review of 22 randomized controlled trials of systemic and topical antibiotics and antiseptics for venous ulcer treatment found no evidence that routine use of oral antibiotics improves healing rates. Oral antibiotics are recommended to treat venous ulcers only in cases of suspected cellulitis. Suspected osteomyelitis warrants an evaluation for arterial disease and consideration of intravenous antibiotics to treat the underlying infection. Although increased exercise is frequently advised by family physicians, it has the greatest impact on lymphedema. Wet-to-dry dressings are not useful for the treatment of ulcers caused by venous insufficiency.

Reference: Current Medical Diagnosis & Treatment 2015, 54th ed. (2015); Ch. 6

Item 114

ANSWER: B

The correct answer is avascular necrosis of the femoral head. This patient's presentation of anemia, slow-healing ulcers, and flow murmur are concerning for sickle cell disease. Avascular necrosis of the hip is a known complication of this disease and should be considered. Agranulocytosis could lead to ulcerations but would not explain the presentation of his hip symptoms. Congenital bone cysts generally do not cause pain and are often found incidentally. Congenital dysplasia of the hip would likely present with abnormal gait but not inability to bear weight, nor would it worsen this significantly over a matter of months. Normal abdominal examination findings make referred pain from an abdominal source unlikely.

Reference: Current Diagnosis & Treatment: Pediatrics, 26th ed. (2022); Ch. 30: Hematologic Disorders

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 115

ANSWER: D

The correct answer is pyogenic granuloma. Pyogenic granuloma typically presents as a fast-growing lesion that appears suddenly, sometimes at a site of prior trauma. The lesion often starts as a small red spot, which quickly grows into a raised nodule that bleeds easily. The exhibits show a typical appearance of a pyogenic granuloma. Treatment is removal by curettage with cauterization or excision. Basal cell carcinomas usually develop on areas exposed to the sun, especially the face, head, and neck, but can occur anywhere on the body. The cancers may appear as flat, firm, pale or yellow areas, similar to a scar; raised reddish patches; or pink, pearly papules with irregular pigmentation and abnormal blood vessels. The erythematous, pedunculated nodule pictured is not typical of a basal cell carcinoma. Cutaneous larva migrans manifests as an erythematous, serpiginous, pruritic, cutaneous eruption caused by accidental percutaneous penetration and subsequent migration of larvae of various nematode parasites. Cutaneous larva migrans is most commonly found in tropical and subtropical geographic areas and the southwestern United States. It is usually self-limited after 4 to 8 weeks. A bleeding nodule is not typical. Nodular melanoma should be included in the differential diagnosis of nodular lesions. Nodular melanoma presents as a rapidly enlarging lump (over several weeks to months). The characteristics of nodular melanoma include:

- Larger size than most moles
- Greater than 6 mm in diameter at diagnosis
- Dome-shaped, often symmetrical, firm lump
- Single color or variable pigmentation, most often black, red, or skin-colored
- Smooth, rough, crusted, or warty surface

The lesion may itch, sting, ulcerate, or bleed. The lesion in the exhibits is not the typical dome-shaped mass. Seborrheic keratoses start as small, rough bumps, which slowly thicken and get a warty surface. They range in color from white to black. Most are tan or brown. Seborrheic keratoses have a waxy, "pasted on the skin" look. Seborrheic keratoses are slow-growing and usually do not bleed.

Reference: Tintinalli's Emergency Medicine: A Comprehensive Study Guide, 9th ed. (2020); Ch. 253: Skin Disorders: Extremities; Vascular Cutaneous Conditions; Pyogenic Granuloma
Harrison's Principles of Internal Medicine, 20th ed. (2018); Ch. 72: Cancer of the Skin

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 116

ANSWER: B

The correct answer is *Haemophilus influenzae* type b. This patient presents with a case of epiglottitis, which can happen at any age. The most common cause of epiglottitis in children is infection with *Haemophilus influenzae* type b (Hib) bacteria. The bacterium also causes pneumonia, meningitis, and blood infections. Routine Hib vaccination for infants has made epiglottitis rare in children; it is now more common in adults. The condition needs quick care to prevent deadly complications. The drooling, dysphagia, respiratory distress (stridor), anxiety, and classic thumb sign on a cervical soft-tissue radiograph are classic presentations of this disorder. *Corynebacterium diphtheriae* produces a toxin that results in a thick gray pseudomembrane covering in the nose, tonsils, and larynx that affects the respiratory mucosa, with associated weakness, sore throat, mild fever, swollen glands in the neck, and heart, nerve, and renal damage. Parainfluenza virus type 1 is part of a group of viruses that cause colds, croup, bronchiolitis, and pneumonia. More severe cases are in children less than 5 years of age or adults more than 65 years of age. This is different from the influenza A, B, and C viruses. *Streptococcus pyogenes* (group A streptococcus) causes pharyngitis, a nonbullous impetigo, and necrotizing fasciitis. Group A streptococcus is not associated with the epiglottitis presentation. Genetic predisposition means there is an increased risk of developing a particular disease based on genetic makeup but is not a guarantee the person will develop the disease. There is some increased risk of getting epiglottitis if a person has a weakened immune system or is not fully vaccinated. There is not a clear genetic predisposition or a connection of these risks in the patient presentation.

Reference: StatPearls (Updated Oct 2022); Epiglottitis

Item 117

ANSWER: A

The correct answer is acute respiratory acidosis. Severe acute exacerbations of chronic obstructive pulmonary disease can cause acute respiratory acidosis due to severe ventilation-perfusion mismatch and a high work of breathing, with respiratory muscle fatigue leading to hypercapnia and respiratory acidosis. Normal arterial pH is 7.35 to 7.45. The low pH of 7.30 defines this patient as acidotic. In the setting of dyspnea due to an acute respiratory cause, the correct answer is acute respiratory acidosis. Metabolic acidosis is caused by increased production of H^+ or by excessive loss of HCO_3^- . Metabolic acidosis is commonly encountered in diabetic ketoacidosis, renal causes, diarrhea, trauma, shock, and critically ill patients. It can also be caused by an overdose of salicylates and alcohol. None of these conditions are present in this patient. To determine the presence of a mixed acid-base disorder with a blood gas value, one would need to identify alterations in either HCO_3^- or PCO_2 that differ from expected compensation levels. This would indicate a second process is affecting the pH. In this instance, the elevated PCO_2 level due to increased work of breathing adequately explains the acidosis. The HCO_3^- is within the range expected in a patient with acute respiratory acidosis. With a pH of 7.30, the patient's condition cannot be defined as either respiratory or metabolic alkalosis. The arterial pH would need to be greater than 7.45 to consider these choices in this patient.

Reference: StatPearls (Updated Jun 2023); Respiratory Acidosis

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 118

ANSWER: E

The correct answer is vancomycin (Vancocin[®]), ceftriaxone (Rocephin[®]), and dexamethasone (Decadron[®]). Based on this patient's history and presentation, pneumococcal meningitis is suspected. The recommended empiric antimicrobial therapy for acute bacterial meningitis is based on age. For patients 1 month to 50 years of age, vancomycin (Vancocin[®]) plus a third-generation cephalosporin is recommended. The addition of dexamethasone (Decadron[®]) is recommended in most adult patients, especially those with suspected pneumococcal meningitis, to blunt intense inflammatory response. Vancomycin (Vancocin[®]), cefepime (Maxipime[®]), and ampicillin (Principen[®]) is the recommended empiric therapy for patients 50 years of age and older. Ampicillin (Principen[®]) is added to cover *Listeria monocytogenes*. Ampicillin (Principen[®]) and gentamicin (Garamycin[®]) is the recommended empiric therapy for patients less than 1 month of age. Cefotaxime (Claforan[®]) and ampicillin (Principen[®]) is missing vancomycin (Vancocin[®]), which should be included for any empiric therapy in an older adult but is adequate for patients less than 1 month of age. Vancomycin (Vancocin[®]) and meropenem (Merrem[®]) is the recommended therapy for penetrating trauma, post-neurosurgery, or a cerebrospinal fluid shunt.

Reference: Textbook of Family Medicine, 9th ed. (2016); Ch. 15: Infectious Diseases; Key Treatment
Textbook of Family Medicine, 9th ed. (2016); Ch. 41: Neurology; Table 41-18

Item 119

ANSWER: A

The correct answer is femoral neck T-score of -2.5. T-scores are based on the comparison of a patient's bone density with a healthy young adult of the same sex using standard deviations above and below the mean. Z-scores are comparisons matched for age, sex, and ethnicity using standard deviations above and below the mean. The World Health Organization (WHO) defines osteoporosis as a T-score of 2.5 standard deviations below the mean (-2.5). Bisphosphonates (first-line therapy) are to be considered, along with calcium, vitamin D, and exercise, when a patient is diagnosed with osteoporosis and there is no contraindication to the medication. Z-scores are not used in the definition of osteoporosis. A positive T-score indicates increased bone density, and bisphosphonate therapy is not likely indicated. A T-score of -1.5 meets criteria for osteopenia, not osteoporosis. This would be an indication to consult the patient's Fracture Risk Assessment Tool (FRAX[®]) score. Other data included in the FRAX[®] score would need to be evaluated before considering bisphosphonate therapy as a treatment.

Reference: Harrison's Principles of Internal Medicine, 20th ed. (2018); Ch. 404: Osteoporosis; Treatment; Pharmacologic Treatment of Osteoporosis
Current Medical Diagnosis and Treatment 2014, 53rd ed. (2014); Ch. 26; pg. 1103-1105

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 120

ANSWER: B

The correct answer is karyotype analysis. Turner syndrome should be suspected with a presentation of amenorrhea past the expected age of menarche and short stature. The average height for young women with Turner syndrome is 1.4 m (4'8"), while normal adult female average height is 1.6 m (5'4"). Therefore, karyotype analysis is appropriate. The initiation of oral contraceptives is not appropriate, as the patient has not been adequately worked up for her amenorrhea. Pelvic ultrasonography would confirm the presence or absence of the uterus and ovaries and may provide clues to a pelvic outlet obstruction. It is generally part of the workup of primary amenorrhea. However, given the clinical history, examination findings, and laboratory study results, karyotype analysis is warranted. A serum dehydroepiandrosterone (DHEA) level is not appropriate to order, as the patient has no symptoms or signs of hyperandrogenism. Watchful waiting is not appropriate, as this patient has no secondary sexual characteristics at 17 years of age.

Reference: American Family Physician (Jul 2019); Vol. 100, Issue 1; Amenorrhea: a systemic approach to diagnosis and management; pg. 39-48

American Family Physician (Jun 2013); Vol. 87, Issue 11; Amenorrhea: an approach to diagnosis and management; pg. 781-788

Item 121

ANSWER: C

The correct answer is anticentromere. An anticentromere antibody test would be the most helpful in making the diagnosis of limited scleroderma. This patient has CREST syndrome, which is associated with limited scleroderma. Anticentromere antibodies are present in about 50% of patients with CREST syndrome and in only 1% of individuals with diffuse scleroderma (which is not associated with CREST syndrome). Anticentromere antibodies are highly specific for limited scleroderma. Anti-Jo-1 is the most common myositis-specific autoantibody. It is not seen in patients with scleroderma. An antineutrophil cytoplasmic antibody (ANCA) test is a serum test that helps in the diagnosis of granulomatosis with polyangiitis and other related vasculitis. ANCA is not found in patients with scleroderma. Anti-Sm antibodies and anti-double-stranded DNA are specific for systemic lupus erythematosus, but they are not sensitive, since they are present in about 60% and 30%, respectively. Anti-Sm antibodies are not found in patients with scleroderma. Anticyclic citrullinated peptide antibodies, with 95% specificity, are the most specific blood test to confirm the diagnosis of rheumatoid arthritis.

Reference: Current Medical Diagnosis & Treatment 2016, 55th ed. (2016); Ch. 20: Rheumatologic, Immunologic, & Allergic Disorders

Item 122

ANSWER: B

The correct answer is clozapine (Clozaril®). All of these medications are antipsychotics used to treat schizophrenia. Of the choices listed, clozapine (Clozaril®) is the most likely to cause this particular combination of laboratory abnormalities. All of the medications listed can cause weight gain, with aripiprazole (Abilify®) causing the least amount of weight gain. Hyperglycemia can also occur with the second-generation agents, especially clozapine (Clozaril®), quetiapine (Seroquel®), and olanzapine (Zyprexa®). While several of these medications are associated with alterations in leukocyte count, risperidone (Risperdal®) is not among them, and clozapine (Clozaril®) is most associated with agranulocytosis, with up to 1% of patients using this medication experiencing agranulocytosis.

Reference: Katzung & Trevor's Pharmacology: Examination & Board Review, 13th ed. (2021); Ch. 29: Antipsychotic & Bipolar Disorder Agents

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Item 123

ANSWER: C

The correct answer is left superior innominate shear. While this patient's findings are listed on the right, they must be interpreted in terms of the relative findings on the left since that is the side of the positive standing flexion test result, which correlates to the side of the somatic dysfunction. With both the ASIS and PSIS superior on the left along with a positive standing flexion test result on the left, the innominate must be superior on the left. An anterior innominate rotation on the left would be correlated with a positive standing flexion test result on the left and a superior PSIS on the left, but the ASIS would be inferior on the left. A posterior innominate rotation on the left would be correlated with a positive standing flexion test result on the left and a superior ASIS on the left, but the PSIS would be inferior on the left. An inferior innominate shear on the right would demonstrate the physical examination findings listed, but the standing flexion test result would be positive on the right. A posterior innominate rotation on the right would be correlated with a positive standing flexion test result on the right, not the left. Also, the left ASIS would be inferior to the right ASIS.

Reference: An Osteopathic Approach to Diagnosis and Treatment, 4th ed. (2021); Ch. 59: Evaluation of Pelvis; Interpretation

Item 124

ANSWER: E

The correct answer is hyponatremia. This patient's chest radiograph reveals a large left perihilar mass that should be considered a bronchogenic carcinoma until proven otherwise based on the patient's age, clinical symptoms, and smoking history. There are several paraneoplastic syndromes associated with bronchogenic carcinomas. Hyponatremia from syndrome of inappropriate secretion of antidiuretic hormone and/or ectopic antidiuretic hormone production by tumors is seen in most types, including small cell carcinoma. Derangement in serum potassium is not a common paraneoplastic syndrome associated with bronchogenic carcinoma. As mentioned above, one would expect hyponatremia, not hypernatremia, from syndrome of inappropriate secretion of antidiuretic hormone and ectopic antidiuretic hormone production by bronchogenic tumors. Hyperthyroidism is not a paraneoplastic syndrome associated with bronchogenic carcinomas.

Reference: Ferri's Clinical Advisor, 1st ed. (2016); pg. 751

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Item 125

ANSWER: C

The correct answer is herpesvirus. Gingivostomatitis is caused by herpesvirus. The fever of gingivostomatitis is high, from 40.0°C to 40.6°C (104.0°F to 105.0°F). Gums are markedly swollen and frequently bleed. There are often vesicles along the gum line, lips, tongue, palate, tonsils, or pharynx. There is tender submandibular, submaxillary, and cervical lymphadenopathy. The illness resolves spontaneously in 7 to 14 days. Hand-food-and-mouth disease is typically caused by multiple variants of coxsackievirus A and B. It may also be caused by enterovirus. Generally, there is mild illness with low or no fever. The patient will have an inflamed oropharynx with scattered vesicles on the tongue, palate, gingiva, and lips. The lesions may ulcerate, creating a shallow ulcer with surrounding erythema. There is also a maculopapular, pustular, and/or vesicular rash that will occur on the hands and feet and may be generalized to the buttocks and groin. This is a self-limited infection that resolves after 1 week. Mononucleosis, which is most commonly caused by the Epstein-Barr virus, is characterized by the gradual progression of malaise and fatigue with acute fever or fever for more than 1 week. There will be headache, sore throat, nausea, and myalgia. On examination, there will be generalized lymphadenopathy, primarily in the anterior and posterior cervical nodes. Epitrochlear lymphadenopathy is common with mononucleosis infection. The pharyngitis of mononucleosis will have significant tonsillar enlargement and sometimes exudates. Rashes can occur in a small percentage of cases and are generally maculopapular. Parvovirus infection is characterized by a sudden onset with no or low-grade fever. The rash begins with bright erythema of the cheeks, which results in a "slapped cheek" appearance. This develops into a maculopapular rash involving the arms, trunk, and legs that looks "lacy" or reticular. Fluctuations of the rash may last 2 to 3 weeks. There is no mucosal involvement. Strep throat is characterized by the rapid, sudden onset of sore throat and fever. Headache and abdominal pain are common. It will have no associated cough. The pharynx is red with enlarged tonsils, and there are petechiae on the soft palate. The anterior cervical lymph nodes will be swollen and tender. There can be a fine, papular, sandpaper-feeling rash.

Reference: Nelson Textbook of Pediatrics, 21st ed. (2020); pg. 1440-1450, 1692-1693, 1699, 1715-1716, 2193

Item 126

ANSWER: A

The correct answer is amoxicillin-clavulanate (Augmentin®) 875 mg of amoxicillin and 125 mg of clavulanate 2 times daily. The majority of human bite wounds occur on the hands and have a high (greater than 50%) risk of infection. The bacterial flora consists of multiple aerobic and anaerobic organisms. Prophylactic antibiotic administration with amoxicillin-clavulanate (Augmentin®) is recommended for bites that penetrate the epidermis. The correct answer can be used as monotherapy. Clindamycin (Cleocin®) is usually dosed 3 times per day and used in combination with other antibiotics, such as trimethoprim-sulfamethoxazole (Bactrim®) or ciprofloxacin (Cipro®). Ciprofloxacin (Cipro®) is usually dosed 2 times per day and would be used in combination with clindamycin (Cleocin®) or metronidazole (Flagyl®) for this particular type of infection. Penicillin V potassium (Pen VK®) is usually dosed 3 to 4 times per day and is not the treatment of choice as monotherapy for human bite wounds. Trimethoprim-sulfamethoxazole (Bactrim®) is dosed twice per day and would be used in combination with clindamycin (Cleocin®) or another agent for the prophylactic treatment of this mixed anaerobic and aerobic infection.

Reference: Journal of Trauma and Acute Care Surgery (Mar 2015); Vol. 78, Issue 3; The current concepts in management of animal and human bite wounds; pg. 641-648

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Item 127

ANSWER: C

The correct answer is parvovirus B19. Aplastic crisis is defined as having a reticulocyte count of less than 1%. Parvovirus B19, the causative agent of erythema infectiosum, causes aplastic crisis by causing a temporary arrest of erythrocyte production. Erythrocyte production is increased in sickle cell disease due to the hemoglobinopathy. Most cases resolve within 2 weeks of infection. Severe disease requires red blood cell transfusions. Coxsackievirus A16 is the causative agent of hand-foot-and-mouth disease and herpangina and does not cause aplastic crisis. Human herpesvirus 6 is the causative agent for roseola and can lead to high fever and a rash but does not cause aplastic crisis. Rubeola virus, the causative agent for measles, leads to a morbilliform (erythematous, maculopapular blanching) rash and high fever. It has dozens of complications, including death. Coxsackievirus, human herpesvirus 6, rubeola virus, and varicella-zoster virus can all lead to vasoocclusive crisis due to dehydration from the associated fever and the infections themselves.

Reference: Harrison's Principles of Internal Medicine, 21st ed. (2022); Ch. 197: Parvovirus Infections
Williams Hematology, 10th ed. (2021); Ch. 37: Pure Red Cell Aplasia
<https://emedicine.medscape.com/article/205926-overview>

Item 128

ANSWER: A

The correct answer is biennial mammography. According to the U.S. Preventive Services Task Force (USPSTF) and American Academy of Family Physicians (AAFP), women up to 74 years of age should be screened biennially with mammography. According to the American Cancer Society (ACS), women 55 years and older may opt for biennial mammograms. A CA-125 level is not recommended as a screening test for ovarian cancer. This patient should undergo a colonoscopy within the next 3 to 8 years, not in 10 years. Lung cancer screening with a low-dose CT scan of the chest is recommended in patients 50 to 80 years of age with a 20 pack-year history who currently smoke or have quit within the past 15 years. This patient only has a 10 pack-year history. Pap smears can be discontinued after age 65 if all Pap smear results have been normal in the past 20 years.

Reference: American Family Physician (Apr 2016); Vol. 93, Issue 8; Cancer screening in older patients; pg. 659-667
<https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/lung-cancer-screening>

Item 129

ANSWER: B

The correct answer is prescribe a 10-day course of oral vancomycin (Vancocin®). This patient has severe *Clostridioides difficile* colitis, even though her abdominal examination findings are benign. According to the Infectious Disease Society of America (IDSA), severe *Clostridioides difficile* colitis is defined as a leukocyte count greater than $15.0 \times 10^3/\text{mcL}$ or an elevation in creatinine. Treatment for severe or complicated *Clostridioides difficile* is oral vancomycin (Vancocin®). Metronidazole (Flagyl®) is no longer considered a first-line treatment for *Clostridioides difficile* infections. Recommend that she present to the hospital for admission for intravenous antibiotics is incorrect. There is no need for intravenous antibiotics. Outpatient therapy has not yet failed, and she is hemodynamically stable. Loperamide (Imodium®) is known to cause toxic megacolon and therefore should not be used in patients with suspected inflammatory diarrhea.

Reference: American Family Physician (Feb 2020); Vol. 101, Issue 3; *Clostridioides difficile* infection: update on management; pg. 168-175

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CRITIQUE BOOK**

Item 130

ANSWER: D

The correct answer is *Streptococcus pneumoniae*; doxycycline (Vibramycin®). This patient's age, medical history, and clinical presentation are consistent with community-acquired pneumonia. *Streptococcus pneumoniae* is the most common cause of community-acquired pneumonia, and doxycycline (Vibramycin®) is an acceptable alternative treatment option in patients with a documented macrolide allergy. Trimethoprim-sulfamethoxazole (Bactrim®) is not the recommended antibiotic for treatment of *Streptococcus pneumoniae* infection. *Pseudomonas pneumonia* is another pneumonia predominately occurring in the hospitalized or immunocompromised patient. Treatment for *Pseudomonas aeruginosa* infection should include an antipseudomonal β -lactam plus a quinolone. Influenza pneumonia typically occurs in patients with chronic illnesses. Most commonly, the radiographic findings include bilateral reticular or reticulonodular opacities with or without superimposed consolidation. When consolidation does occur, it is usually in the lower lobes.

Reference: American Family Physician (Jun 2022); Vol. 105, Issue 6; Community-acquired pneumonia in adults: rapid evidence review; pg. 625-630

Item 131

ANSWER: B

The correct answer is surgical exploration and correction should take place by 12 months of age. The newest recommendation for an undescended testis is to operate at 1 year of age to reduce sequelae risk. If the testicle remains undescended by 1 year of age, treatment is necessary to lower the risk of infertility and cancer. An urgent referral is not necessary, as definitive care occurs at 1 year of age. Surgery after 1 year of age is not the standard of care. Human chorionic gonadotropin (HCG) is helpful for some patients but is not considered first-line treatment.

Reference: Schwartz's Principles of Surgery, 10th ed. (2015); Ch. 39

Item 132

ANSWER: E

The correct answer is self-limited reaction to antitreponemal therapy. The Jarisch-Herxheimer reaction may occur in up to 60% of patients treated for syphilis. The pathogenesis is unclear, but it may be related to the release of antigens from the spirochetes after treating the patient with penicillin G benzathine (Bicillin L-A®) 2.4 million units. The treatment is supportive care, and the symptoms resolve in 1 to 2 days. The patient is not allergic to penicillin and is not experiencing signs of anaphylaxis. As her fourth-generation HIV test result is negative, seroconversion is unlikely. Serum sickness is a reaction to proteins in antiserum derived from a nonhuman animal source that occurs 5 to 10 days after exposure. It is a type of immune complex hypersensitivity. The patient did not receive nonhuman proteins. Of note, herpes serum titers are less helpful for diagnosing a solitary, painless vaginal ulcer; direct sampling is the preferred testing method.

Reference: Goldman-Cecil Medicine, 25th ed. (2016); Ch. 319; pg. 2013-2020

2024 IN-SERVICE EXAMINATION CRITIQUE BOOK

Item 133

ANSWER: A

The correct answer is 24-hour urine 5-hydroxyindoleacetic acid test. This patient's presentation is consistent with carcinoid syndrome. Carcinoid tumors are uncommon neuroendocrine malignancies sometimes found in the small intestine, although other locations are possible. The tumor cells have the potential to secrete hormones, such as serotonin, that can cause difficult-to-control diarrhea and characteristic facial flushing triggered by stress, exercise, and/or alcohol intake. A diagnostic test is the 5-hydroxyindoleacetic acid test obtained in a 24-hour urine sample. A thyroid-stimulating hormone level is utilized in the diagnosis of hyperthyroidism and hypothyroidism. While hyperthyroidism could cause facial flushing or diarrhea, it does not fit the patient's pattern of being triggered by stress, exercise, and/or alcohol intake. Urinary catecholamine levels are used to diagnose pheochromocytoma. Pheochromocytoma could cause similar symptoms to those described in the scenario, but they would be expected to be spontaneous and not follow the above-mentioned pattern. It would also be less associated with diarrhea. A serum angiotensin-converting enzyme level is diagnostic in sarcoidosis, which does not fit this clinical picture. A calcitonin radioimmunoassay is utilized to confirm medullary thyroid carcinoma, which would also not fit this clinical picture.

Reference: Harrison's Principles of Internal Medicine, 21st ed. (2022); Ch. 84: Gastrointestinal Neuroendocrine Tumors
StatPearls (Updated Feb 2023); Medullary Thyroid Cancer
StatPearls (Updated Mar 2023); Pheochromocytoma
StatPearls (Updated Jun 2023); Sarcoidosis
American Family Physician (Mar 2016); Vol. 93, Issue 5; Hyperthyroidism: diagnosis and treatment; pg. 363-370

Item 134

ANSWER: D

The correct answer is phrenic. Abdominal pain may be referred, or may shift to, sites removed from the primarily affected organs. Referred pain denotes noxious (usually cutaneous) sensations perceived at a site distant from that of a strong primary stimulus. Distorted central perception of the site of pain is due to the confluence of afferent nerve fibers from disparate areas within the posterior horn of the spinal cord. Pain due to subdiaphragmatic irritation by cholecystitis, air, peritoneal fluid, blood, or a mass lesion is referred to the right posterior shoulder via the phrenic (C4-mediated) nerve. Pain may also be referred to the shoulder from supradiaphragmatic lesions such as pleurisy or lower lobe pneumonia. The vagus nerve and greater splanchnic nerve convey efferent and afferent information to the gallbladder. However, this information is interpreted by the brain as pain that coincides mainly with pain experienced at the concordant spinal nerve root levels T5-T9 for the splanchnic nerve and the upper cervical regions for the vagus nerve. Therefore, they do not participate in the referred pain in the shoulder due to diaphragmatic irritation. The lesser and least splanchnic nerves supply the small and large intestine via superior and inferior mesenteric ganglia at levels T10-L2, respectively.

Reference: Current Diagnosis & Treatment: Surgery, 14th ed. (2014); Ch. 21

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Item 135

ANSWER: B

The correct answer is creating tension on the tensor veli palatini muscle and opening the eustachian tube. Mandibular drainage, also known as the Galbreath technique, involves anterior traction of the mandible, which by extension applies tension to the tensor veli palatini at the orifice of the eustachian canal. This tension opens the orifice, permitting passage of air to equilibrate the middle ear pressure to the environment. Lymphatic change may occur along the eustachian canal due to this technique, but the cervical lymph nodes will not be impacted. Autonomic tone would be addressed by treating the upper cervical spine for vagal tone and T1-T4 for sympathetic tone. Negative thoracic pressure is a function of the diaphragm and would mostly improve with treatment of the diaphragm and rib cage structures. Manually moving lymph along the anterior cervical lymph nodes would be accomplished by cervical effleurage. Reducing sympathetic tone to the sinuses, leading to decreased tissue congestion would be accomplished by treating the upper thoracics. While all of these incorrect options may have some influence on otitis media, none of them are directly related to the mechanism of action for mandibular drainage, which is primarily mechanical.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 42B: Osteopathic Considerations in Pediatrics; Five Models of Osteopathic Care

Item 136

ANSWER: B

The correct answer is perform the Galbreath technique. Acute otitis media is a common illness in children. For children over 6 months of age, so long as speech development is progressing normally, observation is recommended, as otitis media is usually self-limited. In cases of tympanic membrane rupture or severe symptoms, antibiotics are an appropriate first-line treatment, but for the patient in this scenario, it is appropriate to provide observation with reassessment in 48 to 72 hours and perform osteopathic manipulative treatment today to improve eustachian canal drainage. Poor drainage is one of the most accepted reasons for children to develop otitis media. The Galbreath technique, or mandibular drainage, applies tension to the tensor veli palatini and opens the orifice of the eustachian canal, facilitating pressure equilibration of the middle ear and reduction of pain. Amoxicillin (Amoxil®) 40 to 50 mg/kg daily, divided into twice-per-day dosing is the dosing for sinusitis and skin and soft tissue infections, not otitis media. Amoxicillin (Amoxil®) 80 to 90 mg/kg daily, divided into twice-per-day dosing is the appropriate dose for otitis media, but since the patient lacks any severe symptoms or perforation, antibiotics are not indicated. Ciprofloxacin (Cipro®) drops are not recommended, as they will not penetrate the tympanic membrane except in cases of tympanic membrane rupture. Osteopathic manipulative treatment to C5 is unlikely to impact eustachian canal function, as it is not related to the middle ear. OA and condylar somatic dysfunctions are often related to otitis media; however, these findings were not noted in this patient.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 42
Current Diagnosis & Treatment: Pediatrics, 22nd ed. (2014); Ch. 18
Pediatrics (Mar 2013); Vol. 131, Issue 3; The diagnosis and management of acute otitis media; pg. e964-e999

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CRITIQUE BOOK**

Item 137

ANSWER: D

The correct answer is right-on-left sacral torsion. Right-on-left sacral torsion is the correct diagnosis based on the listed physical examination findings. The mechanics of sacral/lumbar osteopathic motion should always be used when performing a structural examination. Some general rules/principles of sacral motion as applied to sacral torsion are as follows:

1. The axis is always opposite of the side of a positive seated flexion test result.
2. When the sacrum is rotating to the same side as its axis (i.e., forward torsion), it will improve in the sphinx position and spring freely, which is a negative spring test result. For example, a positive seated flexion test result on the right, sacral dysfunction that improves in the sphinx position, and a negative spring test result indicate left-on-left sacral torsion. Backward torsions will have a positive spring test result.
3. If L5 is rotated left, then the sacrum will rotate right in the opposite direction.

The incorrect options involving a right-sided dysfunction can be immediately eliminated using the first key sacral torsion mechanics rule listed above (the axis is always opposite of the side of a positive seated flexion test result). Since the patient described has a positive seated flexion test result on the right, the sacral axis has to be on the left. Left-on-left sacral torsion can also be eliminated using the spring test rule. Since the patient has a positive spring test result, she is unlikely to have a forward sacral torsion. Hence, the correct answer is a backward sacral torsion.

Reference: An Osteopathic Approach to Diagnosis and Treatment, 4th ed. (2021); pg. 277-281

Item 138

ANSWER: D

The correct answer is T7-T8 neutral, sidebent left, rotated right. Given the patient's age, location of abdominal pain, exacerbating factor, and associated symptoms, the most likely diagnosis is cholecystitis. The gallbladder receives its sympathetic innervation from T5-T9, and the sympathetic viscerosomatic reflex for the gallbladder is reported to be right-sided and in the region of T7-T10. C7-T3 neutral, sidebent left, rotated right may be representative of head pathology, such as sinus issues, otitis, etc. It could also be due to cardiac or pulmonary pathology. This is inconsistent with the findings presented. T2 extended, rotated right, sidebent right and T3-T4 neutral, sidebent right, rotated left may be related to the head or to cardiac or pulmonary pathology, but they would not manifest this constellation of symptoms. T11-L2 neutral, sidebent left, rotated right could correlate to pathology affecting the small to large intestines or the urogenital system.

Reference: Somatic Dysfunction in Osteopathic Family Medicine, 2nd ed. (2015); Ch. 7: Viscerosomatic Reflexes and Somatovisceral Influences

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CRITIQUE BOOK**

Item 139

ANSWER: C

The correct answer is C5-C6. This neonate most likely has Erb palsy ("waiter's tip") secondary to nerve damage sustained from hyperextension of the head stretching the nerve roots with the associated shoulder dystocia. Because the hand is still flexed but the shoulder is limp, the C5-C6 nerve root is most likely damaged. C1-C4 are typically not damaged from this mechanism. If they were damaged, respiratory distress would usually be noted secondary to diaphragmatic innervation involvement. C8-T1 nerve root damage, or Klumpke palsy, is associated with the clinical presentation of a supinated forearm and a "claw hand" (paralysis of the intrinsic muscles of the hand). Horner syndrome may also be noted. T2-T4 is not associated with nerve root damage from shoulder dystocia.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); pg. 1139

Current Diagnosis & Treatment: Physical Medicine and Rehabilitation, 1st ed. (2015); Ch. 20: Pediatric Rehabilitation

Item 140

ANSWER: C

The correct answer is biceps femoris spasm. The hamstring (biceps femoris, semimembranosus, and semitendinosus muscles) is responsible for knee flexion and also results in secondary hip extension. Spasm of any of these muscles will exert an inferior force on their attachment to the ischial tuberosity, resulting in a posterior innominate rotation. Counterstrain directed to these muscles can alleviate this underlying preference and resolve the persistent posterior innominate rotation. The quadriceps (rectus femoris, vastus medialis, intermedius, and lateralis muscles) is responsible for knee extension, and the rectus femoris also results in secondary hip flexion via its origin at the AIIS. Spasm of the rectus femoris will exert an inferior force on its attachment to the AIIS, resulting in an anterior innominate rotation. Counterstrain directed to this muscle can alleviate this underlying preference and resolve a persistent anterior innominate rotation; however, that is not the patient's finding. Ankylosing spondylitis affects men more than women and results in a kyphotic posture. A lumbar compression fracture could result from a stress fracture due to repetitive loads; however, pain would be experienced in the lumbar midline and local paravertebral muscles with pain reproduction on palpation of the spinous process, not at the sacroiliac joint. Anterolisthesis presents similarly to a lumbar compression fracture but will often also have radicular symptoms coinciding with compressed nerve roots.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 41.B

Item 141

ANSWER: D

The correct answer is recommend rest and restriction of sports participation. Acute spondylolysis responds best to conservative treatment, rest, antiinflammatory medication, and limited gentle manipulation techniques that will address muscle spasm and abnormal posturing. However, even gentle repetitive manipulation may not be the best approach, since acute defects typically heal without intervention. Techniques that involve a thrust, approaching the dysfunctional barrier, or compression should be avoided in the acute phase. This can exacerbate the muscle spasms and worsen the patient's symptoms and injury. Since most acute injuries will self-heal without intervention, a referral to orthopedic surgery, while potentially helpful, is not the best initial approach compared to rest and restriction of sports participation.

Reference: Current Diagnosis & Treatment: Physical Medicine and Rehabilitation, 1st ed. (2015); Ch. 31

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CRITIQUE BOOK**

Item 142

ANSWER: D

The correct answer is superior innominate shear on the left. The standing flexion test result is positive on the left, indicating that the left side is the affected (dysfunctional) side. The ASIS is superior on the left. The PSIS is inferior on the right, which translates to the PSIS being superior on the left by comparison. These findings are most consistent with a superior innominate shear on the left. An anterior innominate rotation on the left requires a positive standing flexion test result on the left, inferior ASIS on the left, and superior PSIS on the left. An anterior innominate rotation on the right requires a positive standing flexion test result on the right, inferior ASIS on the right, and superior PSIS on the right. A posterior innominate rotation on the right requires a positive standing flexion test result on the right, superior ASIS on the right, and inferior PSIS on the right. A superior innominate shear on the right requires a positive standing flexion test result on the right and both the ASIS and PSIS to be superior on the right.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); pg. 1050

Item 143

ANSWER: E

The correct answer is T10-T12 neutral, sidebent right, rotated left. The sympathetic visceral afferent fibers for the small intestine and colon would include fibers derived from T10-L2. Impairment of these fibers could lead to inhibition of sympathetic innervation, causing increased peristalsis. C5 does not have contributory visceral somatic afferent fibers from that region. The level of T1-T4 is associated with visceral somatic afferent fibers that affect the heart and lungs. A firm nodule in the fourth intercostal space is a Chapman reflex point for the lower lung. Rib 5 could potentially impact T5 nerve roots and is involved in stomach or liver innervation.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 10; pg. 247-254

Item 144

ANSWER: A

The correct answer is anterior tilt of the pelvis. The pregnant patient undergoes many biomechanical changes as a result of an expanding uterus. As the uterus expands into the abdomen, the patient's center of gravity shifts anteriorly, which results in increased lumbar lordosis and subsequent anterior tilt of the pelvis. As the pregnant patient's center of gravity shifts anteriorly, this results in an increased (not straightening) lumbar lordotic curve, anterior tilt of the pelvis, and widening (not narrowing) of the gait. Pregnancy results in an increase in total body water, which causes worsening interstitial edema and increased venous and lymphatic congestion. In addition, the expanding uterus pushes abdominal contents upward, which limits diaphragmatic excursion and impairs respiratory function.

Reference: Somatic Dysfunction in Osteopathic Family Medicine, 2nd ed. (2015); Ch. 13: The Female Patient; Obstetrics

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Item 145

ANSWER: A

The correct answer is extensor digitorum longus. The extensor digitorum longus originates at the anterior tibia and medial fibular head and then inserts on the phalanges. Its action is ankle extension. The flexor digitorum brevis originates at the calcaneus and inserts on the phalanges. It causes toe flexion. The gastrocnemius originates at the tibia, inserts on the calcaneus, and causes plantar flexion. The quadratus plantae originates at the calcaneus and inserts on the flexor digitorum longus tendon. The tibialis posterior originates at the posterior tibia and inserts at the navicular. It causes inversion and supination.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 34; pg. 809-810

Item 146

ANSWER: A

The correct answer is OA-C2. The vagus nerve provides parasympathetically mediated viscerosomatic reflexes to the heart and can be influenced by somatic dysfunction at the OA-C2 region. As such, the physician should find associated TART changes in this region. C3-C5 would relate to irritation of the phrenic nerve. T1-T4 would provide sympathetically mediated reflexes to the heart. T5-T9 would provide sympathetically mediated reflexes related to the organs innervated by the greater splanchnic nerve in the gastrointestinal system. S2-S4 would provide parasympathetically mediated reflexes related to parts of the lower gastrointestinal and genitourinary system, as well as motor innervation via the pudendal nerve.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 10

Item 147

ANSWER: A

The correct answer is greater splanchnic nerve. The celiac ganglion receives preganglionic innervation from the greater splanchnic nerve, which arises from T5-T9. L1-L2 would most likely provide preganglionic innervation to the inferior mesenteric ganglion and from the distal third of the colon to the rectum. The lesser and least splanchnic nerves would most likely not innervate the celiac ganglion and are more likely to innervate the superior and inferior mesenteric ganglia. T1-T4 would most likely provide preganglionic innervation to the heart and lungs.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 10

Item 148

ANSWER: D

The correct answer is perform thoracic lymphatic pump. The thoracic lymphatic pump technique is used to facilitate lymphatic and venous return to the heart and reduce pulmonary congestion. A fever is not a contraindication for osteopathic manipulative treatment. Facial effleurage is used primarily for sinusitis. Myofascial iliotibial band release is used in iliotibial band syndrome and can be used to address colon and prostate Chapman reflex points. A posterior Chapman reflex point at the tip of the transverse process of C1 is found in otitis media.

Reference: Somatic Dysfunction in Osteopathic Family Medicine, 2nd ed. (2015); pg. 229, 271-273, 275-277

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CRITIQUE BOOK**

Item 149

ANSWER: E

The correct answer is slurred speech in the treatment position. Absolute contraindications to counterstrain treatment include vascular or neurologic conditions that are exacerbated by the treatment position, lack of consent, absence of somatic dysfunction, and severe illness in which strict positional changes prevent the ability to be placed in the treatment position. Relative contraindications include a patient who cannot voluntarily relax, such that the patient cannot be placed into the treatment position; patients who underreport or are unable to discern their level of pain (i.e., stoic); upper cervical hyperrotation and hyperextension in patients with known vertebral artery disease and/or upper cervical ligamentous instability, dens malformation, or severe osteoporosis; inability to tolerate the classic treatment position, meaning that the treatment position must be modified; inability to effectively communicate; severe acute rheumatologic flare; and signs of apprehension while approaching the treatment position.

Reference: Atlas of Osteopathic Techniques, 4th ed. (2023); Ch. 9

Item 150

ANSWER: B

The correct answer is flutter-valve mucus clearance device. A flutter-valve mucus clearance device most closely reflects manipulation of the thoracic inlet and thoracic diaphragm. The physiologic functions are respiration and circulation. This type of therapeutic modality is supported by the respiratory-circulatory model defined by the 5 models in patient assessment and treatment, as supported by the Educational Council on Osteopathic Principles (ECOP). Antibiotic therapy is not indicated in this case, as the patient was diagnosed with viral pneumonia. A nutrition consultation could be considered within the metabolic-nutritional model of care but will not specifically address the respiratory-circulatory model. Smoking cessation is a recommendation and could be considered within the behavioral-biopsychosocial model. Trending pulse oximetry provides objective data. It is not an intervention.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); pg. 11-12

Item 151

ANSWER: C

The correct answer is T10-T12. The proximal ureter is innervated by T10-L1 sympathetic nerves and the vagus nerve for parasympathetics. Facilitated segments impact the sympathetic innervation, resulting in T10-T12 facilitated changes. The distal ureter is innervated by L1-L2 and the sacral splanchnics. Since the stone is proximal, this area is less likely to be distended or irritated. T5-T9 would account for upper gastrointestinal illnesses, such as gastritis, peptic ulcer disease, hepatitis, or cholecystitis. T1-T4 accounts for cardiac and pulmonary illnesses. L3-L5 has no defined sympathetic or parasympathetic exiting nerve roots present.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 10; pg. 254

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CRITIQUE BOOK**

Item 152

ANSWER: A

The correct answer is a frail, elderly patient. Counterstrain is indicated for a frail patient who is unable to undergo high velocity techniques, a patient who is hesitant about high velocity techniques, or a patient who is hesitant about a trial of manipulation to assess their tolerance. Children who cannot remain passive are not good candidates for counterstrain, nor are patients who cannot voluntarily relax. The presence of a fracture in the area to be treated would be a contraindication. In addition, if a patient has a torn ligament in the area to be treated, it may risk further tearing.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 37: Strain/Counterstrain; Contraindications; pg. 864-884

Item 153

ANSWER: C

The correct answer is obtain radiographs of the ankle and knee. An intoxicated person cannot be ruled out for fracture based on physical examination findings alone, so radiographs must be taken for this patient before proceeding with any treatment plan. The patient's fall was traumatic, so establishing the extent of injury is a top priority, especially when the patient is cognitively impaired. The patient may benefit from nonsteroidal antiinflammatory drugs, osteopathic manipulative treatment, an orthopedic referral, or an ankle brace, but the decision of which to pursue depends on the radiography results.

Reference: Principles of Rehabilitation Medicine (2019); Ch. 12: Peripheral Nerve Injuries: Mononeuropathy; Fibular Nerve

Item 154

ANSWER: E

The correct answer is reviewing the areas of the body that will benefit from treatment and explaining how the physician's hands will be used to provide that treatment. To apply trauma, informed care, and practice principles to the utilization of osteopathic manipulative treatment, physicians should explain how osteopathic manipulative treatment utilizes touch as the modality for treatment. The provider should utilize universal trauma precautions, including explanations of the nature and purpose of applying a technique, how it is performed, and how the patient may experience that technique. Breathing techniques, muscle relaxation, and self-treatment with Emotional Freedom Techniques (EFT) may help reduce a patient's anxiety leading up to an osteopathic manipulative therapy session but have not been shown to help a patient accept physical touch. Educational materials may confuse patients and induce more anxiety.

Reference: The Journal of the American Osteopathic Association (Feb 2018); Vol. 118, Issue 2; Neurobiology of sexual assault and osteopathic considerations for trauma-informed care and practice; pg. e2-e10

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CRITIQUE BOOK**

Item 155

ANSWER: C

The correct answer is direct force toward the restrictive barrier. High velocity, low amplitude is a manipulative technique in which a direct physician-generated force is applied toward the restrictive barrier within the anatomic range of the joint with the patient remaining passive. Direct force away from the anatomic barrier is incorrect. There are 2 opposing anatomic barriers. Direct force toward the neutral position is incorrect. No technique involves a direct force to the neutral position. Indirect force away from the elastic barrier is incorrect. High velocity, low amplitude is a direct force, so any indirect force is incorrect, especially if it moves away from the barrier. Indirect force toward the neutral position is incorrect. High velocity, low amplitude is a direct force technique, and no techniques move to neutral.

Reference: A Teaching Guide for Osteopathic Manipulative Medicine, 2nd ed. (2018); Ch. 5: High-Velocity, Low-Amplitude; pg. 49

Item 156

ANSWER: B

The correct answer is extension and adduction. Extending and adducting the upper extremity allows for the medial border of the scapula to approximate the spine, shortening the rhomboids. Upper extremity flexion and abduction motions will have accompanying protraction and upward rotation, which will add distance between the medial border of the scapula and the spine, lengthening the rhomboids.

Reference: A Teaching Guide for Osteopathic Manipulative Medicine, 2nd ed. (2018); Counterstrain; pg. 31

Item 157

ANSWER: D

The correct answer is supine rib raising. This patient would most likely benefit from treatment addressing somatic dysfunctions related to the mechanics of ventilation. Of the choices provided, supine rib raising is the most appropriate answer when considering the fatigue exhibited by the patient, her comorbidity of severe osteoporosis, and the high oxygen requirements of the presenting condition. Due to the energy expenditure required to sit up and contract the thoracic musculature for seated thoracic postisometric muscle energy, this is not an ideal treatment option for this patient. High velocity, low amplitude to the cervical spine would also be inappropriate due to her severe osteoporosis. Although passive and requiring minimal effort from the patient, thoracic inlet myofascial release and osteopathic cranial manipulative medicine to the occipitomastoid sutures would not directly address the primary mechanical restrictions related to improving her ability to ventilate more efficiently.

Reference: Somatic Dysfunction in Osteopathic Family Medicine, 2nd ed. (2015); Ch. 25; pg. 274-284

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CRITIQUE BOOK**

Item 158

ANSWER: C

The correct answer is postconcussion syndromes. Postconcussion syndromes include somatic dysfunction, for which osteopathic cranial manipulative medicine can be useful. Other clinical presentations that commonly have relevant somatic dysfunction include:

- Cranial neuropathy and/or nerve entrapment
- Bell palsy
- Trigeminal neuralgia
- Colic
- Headache
- Orofacial pain
- Otitis media
- Sinusitis
- Temporomandibular joint dysfunction
- Vertigo
- Feeding difficulties
- Plagiocephaly
- Torticollis
- Tinnitus

Absolute contraindications include:

- Acute intracranial bleeding
- Skull fracture
- Acute stroke

Relative contraindications include:

- Coagulopathies
- Space-occupying lesion in the cranium
- Increased intracranial pressure

Reference: A Teaching Guide for Osteopathic Manipulative Medicine, 2nd ed. (2018); Ch. 10: Osteopathic Cranial Manipulative Medicine; pg. 96-97

Item 159

ANSWER: B

The correct answer is pectoralis minor. The pectoralis minor originates at the coracoid and inserts on ribs 3-5. Therefore, it will exert a superior force on rib 4 to correct the dysfunction. The latissimus dorsi assists with correcting exhalation dysfunctions at ribs 8-10. The scalenus anterior will correct an exhalation dysfunction at rib 1. The scalenus posterior will correct an exhalation dysfunction at rib 2. The serratus anterior will correct exhalation dysfunctions at ribs 6-8. While the serratus anterior attaches at ribs 2-8, the directionality of muscle fibers to their attachments on the scapula would only exert an elevation force on ribs 6-8. The muscles run parallel to ribs 2-5 and would provide a marginal elevation force on them, making the pectoralis a much more efficient muscle to use for correction of exhalation dysfunctions at ribs 3-5.

Reference: Atlas of Osteopathic Techniques, 4th ed. (2023); Ch. 10: Muscle Energy; Costal Region

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Item 160

ANSWER: E

The correct answer is thoracic inlet release. The Galbreath technique, also known as mandibular drainage, is used to treat otitis media. After a lymphatic approach to treatment, obstructions to lymphatic flow from the head and neck should be addressed and can include thoracic inlet release and cervical effleurage. The cranial vault hold is used to diagnose and treat a restriction between the sphenoid and the occiput. It is not used to directly treat acute otitis media. High velocity, low amplitude to the cervical spine will not treat acute otitis media. There is no indication for cervical manipulation. High velocity, low amplitude is less likely to treat acute otitis media and is inappropriate in a 6-year-old patient. Infraorbital nerve stimulation will normalize autonomic tone to the sinuses but will not meaningfully affect eustachian tube function. Pétrissage to the sinuses is used to help drain sinuses and is not used to treat acute otitis media.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 42B; pg. 1143

Item 161

ANSWER: C

The correct answer is perform osteopathic manipulative treatment and refer him to a supervised exercise program. This older patient has a supraspinatus tender point that could easily be treated with counterstrain. However, the number of falls he has had is concerning, and this should also be addressed. Given the fact that he is slow to rise from the chair and has difficulty getting onto the table, he would benefit from a supervised exercise program. Both osteopathic manipulative treatment and supervised exercise programs have been shown to prevent falls. This answer is the only one that addresses both the shoulder pain and the repeated falls. This is a fundamental osteopathic principle—to address the whole patient. His physical examination findings do not suggest a bony injury, as he has full strength and range of motion and the absence of pain over any bony prominences. While he may benefit from physical therapy and nonsteroidal antiinflammatory drugs (NSAIDs), this only addresses the shoulder injury and fails to address the whole patient and the number of falls that he has sustained. Additionally, NSAIDs would not be recommended first-line treatment for this patient given his age and the localized nature of the pain. There is no indication to refer him to orthopedics or order radiography at this time.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 42D; pg. 1194

Item 162

ANSWER: E

The correct answer is thoracolumbar rib raising to improve aeration of the lungs. Complications of a bedridden state include atelectasis, pneumonia, edema, and constipation. Thoracolumbar rib raising and soft tissue techniques can be performed daily to reduce the risk of pneumonia and/or atelectasis. Stimulating T10-L2 will target the sympathetic input to the colon, which decreases peristalsis. Stimulating the vagus nerve (parasympathetic nervous system) will increase bronchial secretions. Applying treatment to T10-T11 will stimulate the sympathetic input to the kidneys to increase the retention of sodium and water, thereby worsening edema. There is no treatment known to improve appetite.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 10; pg. 243-255
Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 42D; pg. 1301

**2024 IN-SERVICE EXAMINATION
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Item 163

ANSWER: B

The correct answer is rotation in opposite directions around an anteroposterior axis. Rotation in opposite directions around an anteroposterior axis creates the mechanics for torsion of the sphenoid on the occiput at the sphenobasilar synchondrosis. Rotation in opposite directions around 2 parallel vertical axes and rotation in the same direction around an anteroposterior axis occurs in sidebending rotation strains of the sphenobasilar synchondrosis. Rotation in the same direction around 2 parallel horizontal axes occurs in vertical strains of the sphenobasilar synchondrosis. Rotation in the same direction around 2 parallel vertical axes occurs in lateral strains of the sphenobasilar synchondrosis. Rotation in opposite directions around 2 parallel horizontal axes occurs during physiologic flexion and extension.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 38; pg. 896-897

Item 164

ANSWER: A

The correct answer is cool, boggy tissue at T12-L2. This patient has classic findings of chronic prostatitis. The viscerosomatic reflexes from the prostate are found at T12-L2. TART changes consistent with chronic conditions include ropey, cool, dry, and boggy tissue texture abnormalities. Edematous, moist tissue at T12-L2 is incorrect. Although this is the correct region for the prostate, this describes acute TART changes, which include tender, warm, moist, and edematous tissues. Edematous, pea-sized nodule 1 cm inferior to the umbilicus describes the Chapman reflex point for the bladder. However, a bladder infection has been ruled out, and the underlying issue is chronic prostatitis. The prostate Chapman reflex point is along the posterior aspect of the iliotibial band. Ropey, dry tissue at T10-T11 and warm, tender tissue at T10-T11 are incorrect. T10-T11 is the region for viscerosomatics from the urinary bladder and ureters rather than the prostate.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 10; pg. 254
Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 40E; pg. 969

Item 165

ANSWER: E

The correct answer is high velocity, low amplitude to the AA joint. Given this patient's history of rheumatoid arthritis with radiographic evidence confirming alar ligament instability, high velocity, low amplitude to the AA joint would be absolutely contraindicated in this patient. Counterstrain of the PC1 inion tender point, counterstrain to the AC3 tender point on the left, and balanced membranous tension to treat a left torsion would all likely be of benefit and are indicated for the treatment of suboccipital or tension-related headaches in patients with ligamentous instability of the AA joint. High velocity, low amplitude to T1-T4 should be far enough away from the ligamentous instability to be at worst a relative contraindication.

Reference: Atlas of Osteopathic Techniques, 3rd ed. (2016); Ch. 11: High-Velocity, Low-Amplitude Techniques; Contraindications

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CRITIQUE BOOK**

Item 166

ANSWER: C

The correct answer is fluticasone (Flovent®). Many medications can lead to dental disease by causing dry mouth, gingival hyperplasia, stomatitis/oral inflammation, or exposure to excess sugars. Inhaled corticosteroids, immunosuppressive agents, antihistamines, proton pump inhibitors, selective serotonin reuptake inhibitors, and stimulants are common offenders. Ibuprofen (Advil®), acetaminophen (Tylenol®), and montelukast (Singulair®) are not known to lead to dental disease. Doxycycline (Adoxa®) may lead to dental discoloration in younger children, but this is a cosmetic concern rather than a causative agent for dental decay and disease.

Reference: American Family Physician (Dec 2018); Vol. 1, Issue 98; Dental problems in primary care; pg. 654-660

Item 167

ANSWER: A

The correct answer is juvenile idiopathic arthritis. Juvenile idiopathic arthritis is the most common chronic rheumatologic disease in children and is one of the most common chronic diseases of childhood. Arthritis of 6 weeks, improvement in joint symptoms after walking, school absences, and a rash are common clinical findings. Fevers that occur daily and resolve spontaneously are a significant associated finding. The rash is often extremely pruritic and resistant to antihistamine treatment. Kawasaki disease is an acute febrile illness of early childhood characterized by vasculitis of the medium-sized arteries with associated mucous membrane symptoms, conjunctivitis, and significant lymph node involvement. Fevers are neither spiking nor intermittent. The rash of Kawasaki disease is not pruritic. Leukemia is a blood-associated malignancy. Bone pain is often present. Physical examination often reveals splenomegaly and petechiae. Fevers are sometimes present but are neither spiking nor intermittent. Lyme disease is a vector-borne disease that presents with flu-like symptoms and associated malaise, myalgia, arthralgia, and headache. Lymphadenopathy is usually present and is painful. The rash has a characteristic bull's-eye appearance with central clearing. Fevers are not intermittent. Osgood-Schlatter disease is a localized bony condition involving the knee. Physical examination findings are very specific, with point tenderness over the tibial tubercle. A firm mass may be palpable. Fevers are not present.

Reference: <https://emedicine.medscape.com/article/1007276-overview>

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Item 168

ANSWER: E

The correct answer is untreated anuria. Untreated anuria is an absolute contraindication for lymphatic techniques for 2 reasons. First, any fluid liberated from congested tissues, primarily from the pulmonary system, would not be able to be removed and therefore would simply redeposit into the tissues. Second, in the setting of untreated anuria, there are much more pressing medical issues that take priority over osteopathic manipulative treatment (OMT) of any variety. Rapid identification and treatment of the causative conditions is the absolute priority for the medical team. Once the patient is again excreting urine or on hemodialysis or peritoneal dialysis, then lymphatic techniques can once again be performed. All of the other answer options are relative contraindications for lymphatic OMT. Most authorities support judicious use of OMT in cancer patients, although one may choose to avoid direct manipulation in the area of malignancy. Osteopathic treatments that increase lymphatic flow have not been demonstrated to increase cancer-spreading risk. It is also a relative contraindication to use lymphatic OMT in certain bacterial infections that have a risk of dissemination. Endocarditis occurs in the setting of already disseminated bacteremia, so further dissemination is unlikely as a result. In a patient with acute heart failure with reduced ejection fraction who is already volume overloaded, lymphatic OMT is relatively contraindicated due to the inability to tolerate excessive preload; however, the fluid drained from the interstitial cellular space of the lungs permits additional oxygenation as this fluid reenters the venous vasculature and is redistributed to the entire body proportionally. Further, selectively decreasing pulmonary congestion utilizing manipulative techniques that target somatic dysfunctions in the thoracic inlet, respiratory diaphragm, and potentially the pelvic diaphragm may assist conventional medical treatments such as diuretics by enhancing lymphatic return and may assist with the removal of additional plasma volume with less risk of hypotension. In acute venous thrombotic disease, lymphatic OMT is relatively contraindicated due to the risk of embolism. Therefore, direct maneuvers to the area of deep vein thrombosis are contraindicated, but additional lymphatic techniques proximal to the area of deep vein thrombosis would not be contraindicated.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); pg. 911

Item 169

ANSWER: C

The correct answer is polymyalgia rheumatica. Polymyalgia rheumatica is a common cause of widespread aching and stiffness that affects adults over the age of 50, especially in white populations. Both sides of the body are equally affected. Involvement of the upper arms, with trouble raising them above the shoulders, is common. Sometimes aching occurs at joints, such as the hands and wrists. Aching is always worse in the morning and improves as the day goes on. Yet inactivity, such as a long car ride or sitting too long in one position, may cause stiffness to return. Results of blood tests to detect inflammation are most often abnormally high; the patient's erythrocyte sedimentation rate is usually above 100 mm/h. Nonsteroidal antiinflammatory drugs are not effective in treating polymyalgia rheumatica. A trial of low-dose corticosteroids quickly relieves stiffness. The response to corticosteroids can be dramatic. Continued therapy with low-dose steroids may be necessary. Fibromyalgia is a muscle disease, and stiffness is not a common manifestation. Palpable pain is noted, and steroids are not effective in relieving symptoms. Lymphoma may be associated with muscle pain and stiffness. The prompt resolution of symptoms associated with corticosteroids is not noted with lymphoma. Thoracic osteoporosis may be present, but pain is usually more localized, and stiffness is not a commonly associated finding. Corticosteroids do not relieve symptoms. Thoracic somatic dysfunction may cause stiffness, but clinical evidence for somatic dysfunction should be present, and symptoms are not relieved by corticosteroids.

Reference: Current Medical Diagnosis & Treatment 2020, 59th ed. (2020); Ch. 20-18: Polymyalgia Rheumatica & Giant Cell Arteritis

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 170

ANSWER: A

The correct answer is administer rabies immune globulin (RIG) and the standard rabies vaccine series. Both rabies immune globulin (RIG) and rabies vaccination are indicated. Postexposure prophylaxis (PEP) consists of a dose of RIG and rabies vaccine given on the day of the rabies exposure and then a dose of vaccine given again on days 3, 7, and 14. For people who have never been vaccinated against rabies previously, PEP should always include administration of both RIG and rabies vaccine. The combination of RIG and vaccine is recommended for both bite and nonbite exposures, regardless of the interval between exposure and initiation of treatment. Lack of abnormal physical examination findings does not rule out exposure when a bat is found in a child's sleeping quarters. Bats have a high exposure risk and should be regarded as rabid unless testing excludes the diagnosis. If caught, the bat should be sent to the state for examination. Results are available within 3 days and would direct the need for immunization. Recommend close observation without any vaccinations is incorrect. Exposure to the bat and the rabies status of the bat are not known. Rabies is a uniformly fatal disease with symptoms beginning up to a month after exposure. Administer rabies immune globulin (RIG) but hold the standard rabies vaccine series is incorrect. There is limited evidence that RIG alone will prevent rabies after exposure. Administer the standard rabies vaccine series alone without rabies immune globulin (RIG) is incorrect. For people with previous vaccination to rabies, this is appropriate. However, this is not the case for this patient. Vaccination alone is not fully preventive. Refer the patient to the local health department for care is incorrect. The health department can provide education, but medical care for rabies exposure is done in the emergency room.

Reference: <https://www.cdc.gov/rabies/hcp/prevention-recommendations/post-exposure-prophylaxis.html>

Item 171

ANSWER: B

The correct answer is order echocardiography. This patient has symptoms consistent with pulmonary hypertension. Pulmonary hypertension is a common, complex group of disorders that result from different pathophysiologic mechanisms but are all defined by a mean pulmonary arterial pressure of 25 mmHg or greater. Echocardiography is recommended as the initial step in the evaluation of patients with suspected pulmonary hypertension. B-type natriuretic peptide (BNP) is a hormone secreted by cardiomyocytes in the ventricles in response to stretching caused by increased ventricular blood volume. The physiologic actions of BNP include a decrease in systemic vascular resistance and central venous pressure as well as an increase in natriuresis. The net effect of these peptides is a decrease in blood pressure due to the decrease in systemic vascular resistance and thus afterload. Before its activation, BNP is stored as the precursor proBNP in secretory granules in both ventricles and, to a lesser extent, in the atria. After proBNP is secreted in response to volume overload and resulting myocardial stretch, it is cleaved to the biologically inert N-terminal fragment NT-proBNP and the biologically active hormone BNP. The 2 fragments are secreted into the plasma in equimolar amounts, and both have been clinically evaluated for use in the management of heart failure. As pulmonary hypertension progresses, heart failure often follows. Pulmonary function testing is an important part of care for patients with pulmonary hypertension once the diagnosis is established. It is informative for establishing the diagnosis; however, it is not the most appropriate next step. Referrals to a cardiologist and pulmonologist are appropriate steps for the care of patients with pulmonary hypertension and should be done after the echocardiogram is obtained.

Reference: American Family Physician (Sep 2016); Vol. 94, Issue 6; Pulmonary hypertension: diagnosis and treatment; pg. 463-469

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 172

ANSWER: A

The correct answer is development of a voiding schedule. In a patient with functional incontinence and cognitive impairment, prompted voiding has been shown to reduce the severity of the problem by half. Pelvic muscle exercises, anticholinergics, and α -blockers do not address the issue. While a urinary catheter would address the problem of skin breakdown and eliminate the incontinence, it would be associated with a high risk of urinary infections and falls.

Reference: Hazzard's Geriatric Medicine and Gerontology, 8th ed. (2022); Ch. 47: Incontinence

Item 173

ANSWER: D

The correct answer is flexion, sidebending left, rotating right. The ease of translation of the occiput to the left indicates a right sidebending dysfunction of the occiput or OA. Sidebending and rotation are coupled to opposite sides at the OA; therefore, the OA is sidebent right and rotated left. The finding is more symmetrical in extension, indicating an extension dysfunction. Therefore, the complete diagnosis is OA extended, sidebent right, rotated left. The high velocity, low amplitude thrust should be directed into the restrictive barrier in all 3 planes. This is opposite the position of the dysfunction and is therefore toward flexion, left sidebending, and right rotation.

Reference: Greenman's Principles of Manual Medicine, 5th ed. (2017); Ch. 13

Item 174

ANSWER: D

The correct answer is vagus. The cranial nerves that pass through the jugular foramen are the glossopharyngeal nerve (CN9), the vagus nerve (CN10), and the spinal accessory nerve (CN11). CN11 compression can contribute to torticollis by resulting in asymmetrical sternocleidomastoid tone. CN10 compression can lead to impairment of parasympathetic function to the majority of the body, terminating at the midcolon. Most significantly, it can mediate suck/swallow difficulties, reflux, and colic in newborns, along with CN9. The facial nerve (CN7) does not exit through the jugular foramen; rather, its visceral efferent fibers pass through the stylomastoid foramen to innervate muscles of facial expression, the stapedius, and the stylohyoid, while parasympathetic visceral efferent fibers pass through the petrotympanic fissure to innervate the lacrimal glands, submandibular and sublingual glands, and small glands of the nasal mucosa. The hypoglossal nerve (CN12) passes through the hypoglossal canal anterior to the foramen magnum, which goes on to innervate the genioglossus, hypoglossus, and styloglossus muscles. The trigeminal nerve (CN5) passes through the superior orbital fissure (V1), foramen rotundum (V2), and the foramen ovale (V3). The branches of the trigeminal nerve innervate facial sensation and taste. The vestibular nerve (CN8) travels to the vestibular complex in the temporal bone via the internal acoustic meatus but does not exit the skull. It innervates in the vestibulocochlear apparatus and conveys information related to balance and hearing.

Reference: Somatic Dysfunction in Osteopathic Family Medicine, 2nd ed. (2015); Ch. 12: The Pediatric Patient; Clinical Conditions; Disorders of the Digestive Tract

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 175

ANSWER: C

The correct answer is T1-T4. This patient has symptoms attributed to the sinuses and upper respiratory tract, which derive their sympathetic innervation from T1-T4. Therefore, the sinuses and upper respiratory tract will stimulate sympathetic afferent innervation back to this region, which will set up a viscerosomatic reflex that involves the T1-T4 region. Thus, T1-T4 is the correct answer. Somatic dysfunctions involving the OA-C2 region would most likely have an influence primarily on the vagus nerve, which is parasympathetic in nature. C3-C5 would involve the phrenic nerve, which is primarily involved in motor innervation to the diaphragm. While somatic dysfunctions affecting the upper cervical spine could have an influence on the superior cervical ganglion and the upper respiratory tract, this ganglion is dependent upon adequate presynaptic innervation from the T1-T4 region for its appropriate function. T5-T9 correlates to the stomach, liver, gallbladder, pancreas, and small intestine. T10-T12 would involve sympathetic viscerosomatic innervation related to the kidney.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 10; pg. 235-236

Somatic Dysfunction in Osteopathic Family Medicine, 2nd ed. (2015); Ch. 7: Viscerosomatic Reflexes and Somatovisceral Influences; pg. 53

Item 176

ANSWER: C

The correct answer is compression of the condylar parts of the occiput. Neonatal issues with poor feeding and nursing problems can be related structurally to cranial somatic dysfunction involving the glossopharyngeal nerve where it exits the jugular foramen and the hypoglossal nerve from occipital bone dysfunctions. Compression of the condylar parts of the occiput can affect the glossopharyngeal nerve and hypoglossal nerve and therefore affect feeding and nursing. Somatic dysfunctions associated with C2 would likely impact either the vagus nerve (parasympathetic) or the superior cervical ganglion (sympathetic). Somatic dysfunctions affecting the vagus nerve (C2) may have some influence on gastrointestinal motility but not on the ability of the infant to perform a coordinated suck reflex, which is required by the infant for feeding and nursing. Somatic dysfunctions associated with T2 primarily affect cardiopulmonary organs. Compression of the sphenosquamous suture affects the ear (chronic otitis media) and throat primarily via muscular attachments. A left sidebending rotation dysfunction of the sphenobasilar synchondrosis is considered a physiological strain pattern and is likely caused by either the birthing process or intrauterine positioning of the developing child.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); pg. 1126, 1133-1135

Somatic Dysfunction in Osteopathic Family Medicine, 2nd ed. (2015); pg. 120

Item 177

ANSWER: D

The correct answer is lying on the right side with the torso turned to the right. To treat anterior sacral torsion, the patient is positioned lying on the side of the axis of the torsion with the chest rotated to the side of the axis and the patient's hips and knees dropped off the table. With right-on-right torsion, the patient is placed in the right lateral recumbent position with the torso turned to the right. The left lateral recumbent position with the torso turned to the left is used to treat left-on-left torsion. Lying on the left side with the torso turned to the right would be used to treat right-on-left torsion. Lying on the right side with the torso turned to the left would be used to treat left-on-right torsion. Supine with both knees to the chest is not a position of treatment for sacral torsions.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 34; pg. 797-812

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 178

ANSWER: D

The correct answer is L2 extended, rotated right, sidebent right. L2 resisting translation from left to right indicates a segment that is sidebent right. Therefore, answer options that include left sidebending are incorrect. The other findings on physical examination (improved symmetry and findings on extension) suggest that the L2 segment is extended. Thus, answer options with flexion or neutral are incorrect. According to Fryette mechanics of the lumbar spine, sidebending and rotation occur in the same direction in nonneutral somatic dysfunctions.

Reference: Atlas of Osteopathic Techniques, 4th ed. (2023); pg. 37-82

Item 179

ANSWER: E

The correct answer is taper off donepezil (Aricept®) for a trial period. Twelve weeks is generally long enough to see improvements, if there will be any, on donepezil (Aricept®). Six months, as in the scenario described, is more than enough time; in addition, the patient's spouse is reporting concerns about the patient's number of medications. It is reasonable in this scenario to then taper off the medication in question for a trial period to see if there was any effect or improvement. Since the patient's spouse is already concerned about the patient's number of medications, adding another medication is unlikely to benefit the patient. Reevaluating after 6 additional months is not helpful, as most patients will see changes within the first 6 months of starting the medication. Most patients did not see a significant improvement in cognition with a dose of 23 mg and did report significantly higher adverse effects. In this case, there are no adverse effects, so there is no need to stop the medication suddenly, which can result in withdrawal symptoms.

Reference: Journal of the American Geriatrics Society (Jan 2018); Vol. 66, Issue 1; Comparative effectiveness and safety of cognitive enhancers for treating Alzheimer's disease: systematic review and network metaanalysis; pg. 170-178

Item 180

ANSWER: C

The correct answer is flattening of the lumbar lordosis and an increased thoracic kyphosis. In the typical older adult, there is a flattening of the lumbar lordosis and an accentuation of the thoracic kyphosis. The typical older adult will demonstrate a flexion posture. Thus, the knees and hips may not extend as far, and forward bending at the lumbar spine may be restricted. Cranial sutures calcify with age, and cranial motion abnormalities can be difficult to detect and interpret in some older adults.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); pg. 1197-1206

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 181

ANSWER: B

The correct answer is perform a rapid antigen detection test for group A streptococcus. This patient has a modified Centor score of 3, which indicates that rapid antigen detection testing (RADT) for group A streptococcus (GAS) infection is advised. Other clinical decision tools, such as the FeverPAIN score and the Centor score, also support this course of action for this particular patient. The evidence (grade A) clearly supports the use of RADT and a validated clinical decision tool for the diagnosis of streptococcal pharyngitis. Empiric treatment for GAS pharyngitis should only be initiated if a clinical decision tool such as the Centor or modified Centor score is greater than or equal to 4. Additionally, the first-line treatment for GAS is penicillin V potassium (Pen VK®), not a macrolide antibiotic. Supportive measures can be offered to this patient, but not until a definitive diagnosis has been reached. A single occurrence of streptococcal pharyngitis is not an indication for an otolaryngology referral unless findings on examination like high fever, uvula deviation, or airway compromise are present. Antiviral medications are not indicated for this patient with likely GAS pharyngitis, though infectious mononucleosis should be considered if the diagnosis of streptococcal pharyngitis is not confirmed.

Reference: American Family Physician (Jul 2016); Vol. 94, Issue 1; Common questions about streptococcal pharyngitis; pg. 24-31

Item 182

ANSWER: C

The correct answer is carvedilol (Coreg®) and labetalol (Trandate®). Carvedilol (Coreg®) and labetalol (Trandate®) are both nonselective and have α -blocking properties. It is not recommended to use noncardioselective β -blockers in any scenario involving reactive airway disease. When there is a need for β -blocker therapy, the selective agents are preferred. The most commonly used agents include metoprolol (Lopressor®), bisoprolol (Zebeta®), and atenolol (Tenormin®). Of the selective β -blockers, bisoprolol (Zebeta®) appears to be the most β -selective of all, though metoprolol (Lopressor®) is more widely used because it came to the market first and has obtained a wide range of indications, including angina arrhythmia, heart failure, hypertension, and post-myocardial infarction treatment. Propranolol (Inderal®), sotalol (Betapace®), and nadolol (Corgard®) are nonselective. Pindolol (Visken®) is nonselective, having intrinsic sympathomimetic activity. Nebivolol (Bystolic®) is a selective β -blocker that has vasodilatory effects, while carvedilol (Coreg®) and labetalol (Trandate®) are nonselective β -blockers that have vasodilatory effects (α -blockade).

Reference: The New England Journal of Medicine (Jan 2020); Vol. 382, Issue 4; Treating hypertension in chronic obstructive pulmonary disease; pg. 353-363

Item 183

ANSWER: C

The correct answer is posterior thrust to the distal tibia-fibula. This patient has an anterior tibia-on-talus dysfunction, which was caused by stopping short on a planted foot. This would cause the talus to glide posteriorly, giving the hard end feel on plantar flexion. To address this problem with high velocity, low amplitude, a posterior thrust would need to be directed to the distal tibia-fibula while the talus is stabilized, allowing the proper joint relationship to be restored. An anterior thrust on the tibia-fibula or a posterior thrust on the talus would be appropriate to address a posterior tibia-on-talus somatic dysfunction. Thrusting on the fibular head in either direction would not improve the ankle mortise orientation.

Reference: Atlas of Osteopathic Techniques, 4th ed. (2023); Ch. 11: High-Velocity, Low-Amplitude Techniques

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 184

ANSWER: B

The correct answer is levator scapulae. Shoulder elevator muscles include the upper trapezius muscles, the rhomboids, and the levator scapulae. Shoulder depressor muscles include the latissimus dorsi, lower trapezius, and lower serratus anterior. The teres minor is considered an external rotator of the humerus.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 26: Screening and Regional Osteopathic Structural Examinations

Item 185

ANSWER: A

The correct answer is OA-C2. Postoperative ileus is a condition that affects both the large and small bowel and receives most of its parasympathetic innervation from the vagus nerve. Postoperative ileus disproportionately affects the small bowel, making OA-C2 a superior choice to S2-S4, which has no contributions to the small bowel. Therefore, treatment of somatic dysfunction that could potentially inhibit vagus nerve impulses such as in the region of OA-C2 would likely provide benefit in preventing postoperative ileus. C3-C5 would likely impact the phrenic nerve, but these segments have no direct influence on the parasympathetic innervation of the gastrointestinal system. Any of the thoracic segments would more likely be associated with sympathetic innervation to the viscera and not parasympathetic innervation. S2-S4 would provide parasympathetic innervation to the distal colon via the pelvic splanchnic nerves but would likely be insufficient in itself to address the more global nature of postoperative ileus.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 48C: Osteopathic Considerations in General Surgery

Item 186

ANSWER: D

The correct answer is right-on-left sacral torsion. Parasympathetic tone to the reproductive tract is provided by a blend of the vagus nerve, which can be impacted by cranial and upper cervical somatic dysfunction, and by the pelvic splanchnic nerves (S2-S4), which are impacted by sacral dysfunctions. Only the pathologic sacral torsion would impact the parasympathetic tone for this patient. The dysfunctions at T10-T12, L1, and L2-L4 could potentially modulate the sympathetic tone. L4 has no direct influence on autonomic tone or lymphatic drainage. Vagus nerve innervation ends at the transverse colon and has a much smaller contribution to the genitourinary tract than the pelvic splanchnic nerves.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); pg. 259-263, 911-913

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 187

ANSWER: B

The correct answer is posterior fibular head on the right. This patient's posterior fibular head is compressing the common fibular nerve. Distribution of this nerve involves innervation of the anterior tibial muscle, which accounts for her footdrop. Sensory distribution of the nerve involves the lateral half of the lower leg and top of the foot. Releasing the compression on the nerve will result in immediate return of sensation but cannot reverse atrophy of the anterior tibialis after 7 years of denervation. The options of L5 flexed, rotated right, sidebent right; superior innominate shear on the right; posterior innominate rotation on the right; and right-on-right sacral torsion have no nervous innervation to the described area. The closest would be the L5 nerve root affected, but that dermatome course wraps around the lower extremity medially below the knee. The case described the lateral half only.

Reference: StatPearls (Updated Mar 2023); Osteopathic Manipulative Treatment: Muscle Energy and HVLA Procedures - Fibular Head Dysfunction

Item 188

ANSWER: D

The correct answer is ECG and troponin I level. This is a classic Chapman reflex point for the heart and points toward underlying cardiac pathology. Circular massage over a gangliform contraction is a treatment method for Chapman reflex points. However, while potentially helpful, treatment of a Chapman reflex point would not supersede an appropriate cardiac workup in this patient. Chest radiography is not indicated, and while her low blood pressure may be abnormal, orthostatic blood pressures are less likely to account for her symptoms. Review of systems and physical examination findings are normal. Osteopathic manipulative treatment can be performed and is appropriate; however, it does not address the underlying problem or the most concerning differential diagnosis. The point described is a Chapman reflex point but would not be appropriate to treat until cardiac etiology is ruled out, so an ECG and troponin I level take priority. It would be most appropriate to fully define the clinical picture before implementing a treatment.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); pg. 970

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 189

ANSWER: C

The correct answer is long-acting muscarinic antagonist combined with a long-acting β -agonist. Chronic management of chronic obstructive pulmonary disease (COPD) patients is complex. The Global Initiative for Chronic Obstructive Lung Disease (GOLD) is an excellent resource for evidence-based recommendations for COPD management. Initial pharmacotherapy decision-making strategies should be driven by symptom assessment and number of COPD exacerbations. This patient has no exacerbations but shows a higher burden of symptoms while only on a short-acting β -agonist as needed. GOLD criteria would recommend adding either a long-acting muscarinic antagonist (LAMA) as monotherapy or a combination LAMA with a long-acting β -agonist (LABA). LAMA monotherapy was not an answer choice. Dual therapy with a LAMA and a LABA is thought to be more effective than monotherapy, with a similar adverse effect profile. Inhaled corticosteroid (ICS) monotherapy is not generally part of the standard treatment algorithms of the GOLD recommendations. ICS therapy combined with a LABA is no longer encouraged either. ICS-LABA and LAMA triple therapy would be a potential option for patients with a history of exacerbations, but it was not an answer choice. The decision to use an ICS is generally driven by blood eosinophil counts. Oral prednisone (Deltasone[®]) is reserved for refractory cases or COPD exacerbations. Courses of oral prednisone (Deltasone[®]) greater than 5 to 7 days increase pneumonia and mortality risk. Roflumilast (Daliresp[®]) is generally reserved for patients with continued exacerbations refractory to other pharmacotherapies.

Reference: American Journal of Respiratory and Critical Care Medicine (Apr 2023); Vol. 207, Issue 7; Global Initiative for Chronic Obstructive Lung Disease 2023 report: GOLD executive summary; pg. 819-837

Item 190

ANSWER: D

The correct answer is topical nonsteroidal antiinflammatory drug. This patient presentation is consistent with knee osteoarthritis, which may be one of the most common musculoskeletal concerns seen by primary care physicians. Over the years, many different treatment options for osteoarthritis have been evaluated for efficacy. The American College of Rheumatology (ACR) has developed recommendations to guide decision-making for the treatment of pain associated with osteoarthritis. When medications are used, those with the least systemic exposure and adverse effect burden are typically considered preferable. Topical nonsteroidal antiinflammatory drugs were strongly recommended as a treatment option for knee osteoarthritis. Structured exercise programs have also been shown to improve pain from osteoarthritis, specifically in the knee. Many treatment modalities have not been found to be helpful. Glucosamine in particular on its own is one of the most widely utilized supplements and is sometimes combined with chondroitin sulfate. Neither has been consistently shown to be efficacious in the treatment of knee osteoarthritis. Data do not suggest that bisphosphonates help with pain improvement or functional outcomes in knee osteoarthritis. Massage therapy was thought to have some benefits for patient care but was given a conditional recommendation against its use for knee osteoarthritis. Transcutaneous electrical nerve stimulation (TENS) has not demonstrated benefit for knee osteoarthritis.

Reference: Arthritis & Rheumatology (Feb 2020); Vol. 72, Issue 2; 2019 American College of Rheumatology/Arthritis Foundation guideline for the management of osteoarthritis of the hand, hip, and knee; pg. 220-233

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 191

ANSWER: D

The correct answer is targeted phototherapy. This patient presentation is consistent with plaque psoriasis, one of the most common dermatologic conditions managed by primary care physicians. New presentations of a rash can be challenging for many family physicians. Correct identification and initiation of treatment are essential steps for dermatologic conditions in primary care. Targeted phototherapy is considered a first-line option for management of mild psoriasis without comorbid psoriatic arthritis. Other options include topical corticosteroids, topical vitamin D analogs, topical calcineurin inhibitors, and a topical keratolytic. Longer regimens of doxycycline (Vibramycin®) can be used for skin infections when clinical suspicion of methicillin-resistant *Staphylococcus aureus* is high, as well as for Lyme disease, among other infectious diseases. Lyme disease is more likely to present with a characteristic "bull's-eye" rash rather than raised plaques. Topical clindamycin (Cleocin T®) can be used to treat a number of infectious conditions, including acne vulgaris and hidradenitis suppurativa. Acne is more likely to present as open or closed comedones or small pustules and nodules, depending on the severity. Hidradenitis suppurativa is more likely to present with painful inflammatory nodules, among other findings. Ustekinumab (Stelara®) is a biologic medication that can be used for treatment of refractory psoriasis, psoriasis associated with psoriatic arthritis, or psoriasis occupying a large surface area of the body. This case showed only 15% surface area. Greater than 30% surface area would indicate the need for ustekinumab (Stelara®). Valacyclovir (Valtrex®) can be used to treat herpetic rashes, such as those found in patients with herpes zoster and herpes. This rash was bilateral, making herpes zoster unlikely, and there were no vesicular lesions, making herpes unlikely.

Reference: JAMA (May 2020); Vol. 323, Issue 19; Pathophysiology, clinical presentation, and treatment of psoriasis: a review; pg. 1945-1960

Item 192

ANSWER: E

The correct answer is refer her for trauma-based psychotherapy. Psychotherapy is the preferred initial treatment for posttraumatic stress disorder (PTSD) and should be offered to all patients. Trauma-focused psychotherapies have high-quality empirical support in the literature and show a superior reduction in PTSD symptoms with a large effect size compared to pharmacotherapy or non-trauma-focused therapies. Pharmacotherapy is important in the treatment of PTSD. Up to one-half of patients with PTSD have residual symptoms after treatment. Selective serotonin reuptake inhibitors and serotonin-norepinephrine reuptake inhibitors are the most effective pharmacologic treatments for PTSD. However, these should not be offered alone as initial treatment but rather in conjunction with therapy or when therapy is not an available option. Tricyclic antidepressants and benzodiazepines may be used as second-line pharmacotherapy for patients in whom multiple trials of first-line treatments have been ineffective. While cognitive-behavioral therapy can be helpful in patients with PTSD, the first-line treatment should be trauma-focused therapy. Most patients with PTSD have comorbidities. Physicians should evaluate and treat behavioral health comorbidities concurrently, but the diagnosis of these should not preclude treatment of PTSD with trauma-focused psychotherapy.

Reference: American Family Physician (Mar 2023); Vol. 107, Issue 3; Posttraumatic stress disorder: evaluation and treatment; pg. 273-281

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 193

ANSWER: D

The correct answer is right lateral recumbent position, lumbar extension, left lumbar rotation, and left hip abduction. This patient's L1 somatic dysfunction has ease of motion to right rotation and right sidebending during flexion, indicating an L1 flexed, rotated right, sidebent right type II somatic dysfunction. This would be the key dysfunction for this patient's psoas syndrome. Muscle energy treatment setup is to place the patient in the right lateral recumbent position, lumbar extension, left lumbar rotation, and left hip abduction to engage the barrier, which is L1 extended, rotated left, sidebent left. Left lateral recumbent position, right lumbar rotation, both hips flexed to 90 degrees, and both feet off the table would release the L2-L5 neutral, sidebent right, rotated left somatic dysfunction noted in this case, not the L1 somatic dysfunction. Left lateral recumbent position, right lumbar rotation, right hip flexed, and right foot off the table would release right-on-left sacral torsion and would not release the L1 somatic dysfunction in this patient's case. Left lateral recumbent position with the torso turned to the left, lumbar flexion, both hips flexed, and both feet off the table would release an L1 extended, rotated right, sidebent right somatic dysfunction and not release the L1 somatic dysfunction as noted in the case. Right lateral recumbent position, lumbar flexion, right lumbar rotation, and left hip abduction would not engage a barrier for L1 extended, rotated left, sidebent left. The left hip abduction would be incorrect in the setup and would not release the L1 somatic dysfunction as noted in the case.

Reference: Atlas of Osteopathic Techniques, 4th ed. (2023); Ch. 10: Muscle Energy Techniques; Lumbar Region

Item 194

ANSWER: A

The correct answer is left-sided dysfunction, bucket handle motion predominant. Somatic dysfunction is named for the ease of motion. In this case, ribs 6-7 on both sides move equally in inhalation. Ribs 6-7 on the left have reduced motion during exhalation, making the left side the dysfunctional side. Since the diagnosis is named for the ease of motion, the diagnosis is a left-sided inhalation dysfunction. The predominant motion of ribs 6-7 is bucket handle motion, not caliper or pump handle. Thus, the correct diagnosis is left-sided dysfunction, bucket handle motion predominant.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); pg. 571-574

Item 195

ANSWER: A

The correct answer is exhalation dysfunction at ribs 3-4 on the left. Somatic dysfunction is named for the ease of motion. In this case, ribs 3-4 on both sides move equally in exhalation. Ribs 3-4 on the left have reduced motion during inhalation. This means that those ribs are stuck down (in exhalation). Since the diagnosis is named for the ease of motion, which is exhalation in this case, the diagnosis is exhalation dysfunction at ribs 3-4 on the left.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); pg. 571-574

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CRITIQUE BOOK**

Item 196

ANSWER: A

The correct answer is left semitendinosus. This patient's diagnosis is on the left side because of the positive standing flexion test result on the left. The ASIS is superior on the right, which means that the left ASIS is inferior, as the focus is only on the side of the positive test result. The PSIS is superior on the left; thus, this patient's innominate diagnosis is an anterior innominate rotation on the left. To treat this patient with postisometric relaxation muscle energy, the patient lays supine on the table, and the left hip and knee are flexed to the flexion barrier. The patient engages the hip extensor muscles and contracts against the physician's force. The left semitendinosus muscle is a hip extensor and is the muscle the patient engages. The vastus lateralis, rectus femoris, and vastus medialis are all hip flexors and would be correct if the patient was being treated with reciprocal inhibition muscle energy. The semimembranosus is a hip extensor, but it needs to be on the left, not on the right.

Reference: Atlas of Osteopathic Techniques, 4th ed. (2023); Ch. 10: Muscle Energy

Item 197

ANSWER: D

The correct answer is right sidebending and left rotation. Somatic dysfunction is named for the ease of motion. In this case, there is a prominent articular pillar on the right, which means that C4 is rotated to the right. This prominence remains in neutral and flexion, so the ease is extension. The diagnosis is C4 extended, rotated right. According to cervical mechanics, sidebending and rotation occur to the same side in an extension dysfunction. Thus, this patient's full diagnosis is C4 extended, rotated right, sidebent right. When treating with high velocity, low amplitude, the dysfunctional segment is placed into its restrictive barrier. The restrictive barrier for this patient's diagnosis is flexion with left sidebending and left rotation. Since this is a cervical dysfunction that is being treated with high velocity, low amplitude emphasizing the rotational component, the correct setup is to sidebend toward the diagnosis (right sidebending) and rotate away from the diagnosis (left rotation) so that a thrust can be applied in the rotational component. Thus, the setup is right sidebending and left rotation. Any positioning which does not encompass all of these features will be suboptimal for treatment.

Reference: Atlas of Osteopathic Techniques, 4th ed. (2023); Ch. 11: High-Velocity, Low-Amplitude Techniques

Item 198

ANSWER: A

The correct answer is extension with left sidebending and left rotation. Somatic dysfunction is named for the ease of motion. In this case, there is a posterior transverse process at T6 on the right, which means that T6 is rotated to the right. This prominence worsens in neutral and extension, so the ease is flexion. The diagnosis is T6 flexed, rotated right. According to Fryette's second law of motion, sidebending and rotation occur to the same side in a flexion dysfunction. Thus, this patient's full diagnosis is T6 flexed, rotated right, sidebent right. When treating with high velocity, low amplitude, the dysfunctional segment is placed into its restrictive barrier in all 3 planes of motion. The restrictive barrier for this patient's diagnosis is extension with left sidebending and left rotation. Any positioning which does not encompass all of these features will be suboptimal for treatment.

Reference: Atlas of Osteopathic Techniques, 4th ed. (2023); Ch. 11: High-Velocity, Low-Amplitude Techniques

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 199

ANSWER: C

The correct answer is flexion with left sidebending and left rotation. Somatic dysfunction is named for the ease of motion. In this case, there is restriction in rotation to the left at L2, which means that L2 is rotated to the right. This restriction remains in flexion and neutral, so the ease is extension. The diagnosis is L2 extended, rotated right. According to Fryette's second law of motion, sidebending and rotation occur to the same side in a flexion dysfunction. Thus, this patient's full diagnosis is L2 extended, rotated right, sidebent right. When treating with high velocity, low amplitude, the dysfunctional segment is placed into its restrictive barrier in all 3 planes of motion. The restrictive barrier for this patient's diagnosis is flexion with left sidebending and left rotation. Any positioning which does not encompass all of these features will be suboptimal for treatment.

Reference: Atlas of Osteopathic Techniques, 4th ed. (2023); Ch. 11: High-Velocity, Low-Amplitude Techniques

Item 200

ANSWER: C

The correct answer is left serratus anterior. The left serratus anterior inserts onto the lateral surface of ribs 2-8. When utilizing muscle energy to correct the exhalation dysfunction at ribs 6-8, the supine patient's ipsilateral shoulder and elbow are flexed 90 degrees. The physician controls the upper extremity at the elbow and contacts the rib angle of the exhalation group top rib (rib 6 in this case) to encourage it into the restrictive barrier of inhalation. The patient's activating force, against equal resistance, is to push the elbow toward the ceiling, which requires the use of the serratus anterior muscle. Therefore, this is the muscle that is recruited to correct the group exhalation dysfunction at ribs 6-8 presented in this case. The shoulder harness portion of the seat belt is most likely the cause of the group rib dysfunction, with its rapid compression on the thoracic cage at impact. The right external intercostal would not be utilized to correct an exhalation dysfunction since the dysfunction is on the opposite side. The left pectoralis minor would be utilized to correct a rib 3-5 group exhalation dysfunction. It inserts onto the superior surface of ribs 3-5 along the anterior axillary line of the thoracic cage. The left middle scalene would be utilized to correct an exhalation dysfunction at rib 1 on the left. It inserts onto the superior surface of rib 1 posterior to the subclavian groove. The right quadratus lumborum would be utilized to correct rib 11 and rib 12 dysfunctions. It originates from rib 12 and inserts onto the superior portion of the iliac crest.

Reference: Atlas of Osteopathic Techniques, 3rd ed. (2016); Ch. 10: Muscle Energy Techniques; Costal Region

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 201

ANSWER: D

The correct answer is improving lymphatic and blood flow to promote healing. In the immediate time after surgery, an osteopathic goal would be to control edema and swelling to promote wound healing by addressing the biomechanical-structural and respiratory-circulatory models of care. This may be accomplished by improving respiratory mechanics as well as addressing common restrictions that would impede lymphatic return and tissue swelling, which may limit microcirculation to the surgical site. Creating more edema would promote the potential for wound dehiscence and secondary infection. Additionally, it would likely have a minimal impact on controlling bleeding without negatively impacting wound healing. Increasing fascial stress on the wound would likewise promote the potential for wound dehiscence and secondary infection and would not likely cause reinforcement of wound closure. Decreased parasympathetic activity would likely create an autonomic environment more suitable for the development of ileus, not prevention of ileus. Enhancing sympathetic activity would cause vasoconstriction as well as diminished peristalsis and have a potentially negative impact on patient recovery.

Reference: Somatic Dysfunction in Osteopathic Family Medicine, 2nd ed. (2015); The Surgical Patient; pg. 143-146

Item 202

ANSWER: C

The correct answer is 56-year-old man who has smoked a pack per day since age 16 and continues to smoke. The U.S. Preventive Services Task Force (USPSTF) recommends screening for lung cancer with a low-dose CT scan of the chest every year for adults aged 50 to 80 years who have a 20 pack-year smoking history and currently smoke or have quit within the past 15 years. The USPSTF also recommends that clinicians stop screening once a person has not smoked for 15 years or has a health problem that limits life expectancy or the ability to have lung surgery. Therefore, the 56-year-old man who has smoked 1 pack per day since age 16 meets both the age and the pack-year requirements to be offered a screening CT scan of the chest. The 47-year-old man is too young for screening per USPSTF recommendations. The 53-year-old man does not reach the lower limit of a 20 pack-year smoking history based on half a pack per day for 20 years. The 80-year-old woman quit smoking more than 15 years ago, so she no longer qualifies for screening. The 84-year-old woman does not qualify for screening because she is over the age of 80.

Reference: JAMA (Mar 2021); Vol. 325, Issue 10; Screening for lung cancer: US Preventive Services Task Force recommendation statement; pg. 962-970

Item 203

ANSWER: C

The correct answer is calcaneal spur. The condition described is plantar fasciitis. Heel spurs are related to increased pull at the attachment of the plantar fascia on the calcaneus. Over time, microscopic changes occur and new bone can be laid down, resulting in the typical radiographic appearance of a heel spur. An accessory ossicle medial to the navicular would represent an os naviculare, which typically is not associated with pain; however, if the area were tender, it would be just distal to the medial malleolus close to the navicular. An avulsion fracture of the fifth metatarsal and lateral displacement of the second metatarsal base typically result from trauma to the foot and ankle and would feature tenderness at the base of the fifth metatarsal and Lisfranc joint, respectively. Injury to the Lisfranc and subtalar joints would limit ambulation on the affected side. Symptoms of a stress fracture would be better in the morning and worse with use. Tenderness would be present over the navicular.

Reference: Harrison's Principles of Internal Medicine, 21st ed. (2022); Ch. 375: Periarticular Disorders of the Extremities

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 204

ANSWER: D

The correct answer is sertraline (Zoloft®). Postpartum depression may be treated effectively with counseling and antidepressants such as sertraline (Zoloft®). Typically, selective serotonin reuptake inhibitors like sertraline (Zoloft®) are considered first-line. Aripiprazole (Abilify®) is indicated for the treatment of psychosis and major depressive disorder. There is no suggestion of psychotic features here, so it would not be first-line treatment for this patient. Cyclobenzaprine (Flexeril®) is a muscle relaxant and is not indicated for depression. Valproic acid (Depakote®) is not indicated to treat postpartum depression, and doxepin (Sinequan®) is indicated for anxiety, psychosis, and related disorders.

Reference: Williams Obstetrics, 26th ed. (2022); Ch. 64: Psychiatric Disorders
Conn's Current Therapy 2014, 1st ed. (2013); Sec. 18: Pregnancy and Antepartum Care; Postpartum Care

Item 205

ANSWER: E

The correct answer is with the patient supine, apply a gentle high velocity, low amplitude tug directed inferiorly using the right leg to treat the dysfunction. This patient presents with findings consistent with a diagnosis of a superior pubic shear. Therefore, the correct answer is with the patient supine, apply a gentle high velocity, low amplitude tug directed inferiorly using the right leg to treat the dysfunction. Pubic shear is very common in pregnancy and typically presents between 30 to 32 weeks' gestation. The 3 types of shear that can occur are vertical shear, anterior-posterior shear, and pubic symphysis diastasis. Vertical shear is diagnosed by noting vertical displacement from one side to the other on the superior border of the symphysis. A gentle leg tug on the more superior side is sufficient for treatment in pregnancy and the postpartum period because the pelvis is very mobile. This is the most common pubic symphysis dysfunction and the type of dysfunction that the patient presents with in this case. Anterior-posterior shear is diagnosed by comparing the anterior-posterior symmetry. The side of dysfunction will be exquisitely tender in acute injury. Treatment may include muscle energy to move the posterior hemipelvis anteriorly. Pubic symphysis diastasis is much less common than pubic dysfunctions and causes much more disability and pain. Pubic symphysis diastasis is diagnosed by widening of the symphysis on a radiograph. This causes extreme instability and difficulty bearing weight. Patients are given a walker; use of a trochanter belt can be helpful. Treatment focuses on correcting asymmetry and relieving somatic dysfunction in the surrounding tissues. A radiograph of the pelvis can be useful in diagnosing pubic symphysis diastasis, which this patient does not have, as she has very little disability and findings are more consistent with a vertical shear. Large-for-gestational age infants can increase the risk of pubic symphysis dysfunction due to lateral traction that occurs during delivery of a large fetus and unequal pressure against the legs when in the McRoberts position. There is a body of evidence suggesting that pregnancy support belts offer benefits in reduction and prevention of low back pain and also improve balance, particularly late in pregnancy. There is no contraindication to treatment early in the postpartum period, and it will greatly reduce the patient's disability.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 47A; pg. 1362-1364

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 206

ANSWER: D

The correct answer is escitalopram (Lexapro®) 10 mg. The hallmarks of bipolar disorder are episodic mood shifts into mania, major depression, hypomania, and mixed mood states. Mania may occur alone, as a mixed episode combined with depression, or in cyclic fashion alternating with depression. Acute manic or hypomanic symptoms respond to mood stabilizers such as lithium (Eskalith®) or valproic acid (Depakote®) after several days of treatment. Lithium (Eskalith®) significantly decreases the frequency and severity of both manic and depressive attacks in about 50-70% of patients and is approved by the Food and Drug Administration (FDA) for maintenance and treatment of manic episodes. Escitalopram (Lexapro®) is a safe, well-tolerated treatment for depression. In patients with bipolar disorder, selective serotonin reuptake inhibitors should not be used alone, as a manic episode can be induced. The patient described in the scenario is well-maintained on a mood stabilizer; therefore, it is appropriate to treat depression by adding a selective serotonin reuptake inhibitor. Close follow-up is necessary to monitor for adverse effects and hypomania. Lamotrigine (Lamictal®) is another adjunctive to lithium (Eskalith®) for prevention of depressive episodes. Antipsychotics such as aripiprazole (Abilify®) may be used for treatment of mania alone or as an adjunct for treatment-resistant depression, but the dose provided is higher than the recommended starting dose. This medication is usually used after an unsuccessful trial of a selective serotonin reuptake inhibitor. High-potency benzodiazepines such as clonazepam (Klonopin®) are indicated for treatment of agitation and sleep disturbances accompanying manic and hypomanic episodes but are not indicated for treatment of associated depression. Propranolol (Inderal®) is indicated for treatment of tremors that may be associated with lithium (Eskalith®) use, but it may worsen depressive symptoms. Carbamazepine (Tegretol®) is used in the treatment of patients with bipolar disorder who cannot tolerate lithium (Eskalith®). Carbamazepine (Tegretol®) is a mood stabilizer and would not be a useful adjunct for depression.

Reference: Neuropsychiatric Disease and Treatment (Aug 2018); Vol. 14; Dosage-related nature of escitalopram treatment—emergent mania/hypomania: a case series; pg. 2099-2104

Item 207

ANSWER: C

The correct answer is fecal incontinence. Loss of bowel and/or bladder control is an indication of cauda equina syndrome, which is caused by severe narrowing from spinal stenosis, acute herniations of the disk, or damage from displaced bony fragments/fractures. An acute sensory deficit of the lateral thigh/lower leg is a sign of L5 nerve root compression. While this warrants further evaluation with an MRI and possible surgery, there are many conservative and minimally invasive injection modalities, as well as osteopathic manipulative treatment, that have been shown to be effective in addressing pain prior to considering surgical intervention, even if there is a "pinched nerve." An absent patellar reflex would be a sign that there is L4 nerve root damage. If a disk herniated between L4 and L5, the L5 nerve root would likely be involved. This, again, would warrant evaluation with an MRI and further workup, but not emergency surgery. Acute urinary retention can be caused by cauda equina syndrome and conus medullaris syndrome, which results from injury to the spinal cord just above the cauda equina and, in addition to urinary retention, may cause constipation early on with saddle anesthesia but without significant pain. However, neither would be associated with dysuria and urgency. New-onset footdrop would indicate a possible compression of the L5 nerve root with weakness of dorsiflexion. This warrants urgent evaluation but is not considered an emergency that warrants immediate surgery.

Reference: Current Medical Diagnosis & Treatment 2021, 60th ed. (2021); Ch. 41-03: Spine Problems
Foundations of Osteopathic Medicine, 3rd ed. (2012); pg. 566
<https://www.dynamed.com/condition/cauda-equina-syndrome>

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 208

ANSWER: B

The correct answer is a glucagon-like peptide-1 receptor agonist. Medications used for the treatment of diabetes mellitus can stimulate insulin secretion, lower tissue glucose levels, slow intestinal absorption of glucose, prolong incretin action, or inhibit renal reabsorption of glucose. A glucagon-like peptide-1 (GLP-1) receptor agonist works by prolonging incretin effects. For a patient with type 2 diabetes and a high body mass index who has not obtained effective control with metformin (Glucophage®), the addition of a GLP-1 receptor agonist is the next recommended therapy. The use of insulin, either a long-acting or sequential short-acting type, will often lead to hypoglycemia in patients with a hemoglobin A1c level of less than 9.0%. Insulin should be initiated immediately when the patient's fasting plasma glucose level is greater than 250 mg/dL, random plasma glucose is consistently greater than 300 mg/dL, or hemoglobin A1c level is greater than 10.0%. These conditions are not met in the patient described. Sulfonylurea products have the potential adverse effect of hypoglycemia, have been shown to be toxic to B cells, and can be associated with weight gain. Split-dosing of long-acting insulin is not warranted in this patient but can be used for patients on high doses of long-acting insulin with poor response.

Reference: Current Medical Diagnosis & Treatment 2020, 59th ed. (2020); Ch. 27-01: Diabetes Mellitus; Treatment Regimens

Item 209

ANSWER: D

The correct answer is within 5 years of diagnosis. The American Diabetes Association (ADA) recommends an initial comprehensive dilated eye examination within 5 years of the onset of type 1 diabetes. Waiting more than 5 years to do a comprehensive dilated eye examination after diagnosis of type 1 diabetes is too long and may miss preventable vision loss due to diabetic retinopathy. A comprehensive dilated eye examination is recommended at the time of diagnosis of type 2 diabetes, not of type 1. Hemoglobin A1c levels have nothing to do with when a patient should have a comprehensive dilated eye examination per ADA criteria.

Reference: Diabetes Care (Jan 2023); Vol. 46, Supplement 1; 12. Retinopathy, neuropathy, and foot care: standards of care in diabetes—2023; pg. S203-S215

Item 210

ANSWER: D

The correct answer is radiography. In a neck-injured patient, the lateral radiograph is obtained first and cleared before the other views are taken. It is the most cost-effective and rapid test to assure that no fracture is present before treating with osteopathic manipulative treatment. While a CT scan can be very useful to evaluate the bony elements, the use of contrast to visualize the bony elements is not indicated in this case. A CT scan is helpful in the evaluation of spinal stenosis, infections with paravertebral abscesses, postsurgical epidural scarring, facet and uncovertebral joint arthritis, primary metastatic tumors of the cervical spine, and trauma to the spinal column. Electromyography is not effective for ruling out fracture in an acute cervical injury. An MRI is more expensive than radiography and is not as effective in evaluating bone compared to a radiograph or CT scan. An MRI of the cervical spine visualizes the vertebral column, intervertebral disks, spinal canal, spinal cord, and cerebrospinal fluid. It is the preferred study in the evaluation of the disks and spinal cord. Ultrasonography is not effective in ruling out fracture in an acute cervical injury.

Reference: Cervical Trauma: Surgical Management, 1st ed. (2019); Ch. 4; pg. 27

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 211

ANSWER: A

The correct answer is acute radiculopathy. Relative contraindications to high velocity, low amplitude include acute herniated nucleus pulposus; acute radiculopathy; acute whiplash; severe muscle spasm, strain, or sprain; osteopenia or osteoporosis; spondylolisthesis; metabolic bone disease; hypermobility syndromes; regional implanted devices and joint replacements; and a history of inflammatory arthritis. Absolute contraindications to high velocity, low amplitude include but are not limited to upper cervical advanced rheumatoid arthritis; Down syndrome; achondroplastic dwarfism; Chiari malformation; fracture, dislocation, or joint instability; joint fusion; Klippel-Feil syndrome; vertebrobasilar or carotid pathology; acute, local inflammatory arthritis; joint infection; malignancy of bone and/or soft tissue; and myelopathy.

Reference: A Teaching Guide for Osteopathic Manipulative Medicine, 2nd ed. (2018); Ch. 5: High-Velocity Low-Amplitude; pg. 51

Item 212

ANSWER: D

The correct answer is 90 seconds. Counterstrain was first described by Lawrence Jones, DO, FAAO, and is predicated on positioning the structure in the place of ease and awaiting the release as the muscle spindle resets. For nearly every structure in the body, Dr. Jones expected to hold the position for 90 seconds unless myofascial change consistent with a release was felt sooner, and 90 seconds is the correct answer here. Holding for 60 seconds is too short for the standard counterstrain technique, and 120 seconds is too long. Although Dr. Jones did suggest it may take time for the patient to relax in the position for rib counterstrain, the position is held for 90 seconds once patient relaxes. Myofascial release may take 20 to 30 seconds, and facilitated positional release is held for 3 to 5 seconds.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 37: Strain/Counterstrain; pg. 864-884

Item 213

ANSWER: A

The correct answer is consult a neurosurgeon for cervical myelopathy on an urgent basis and start steroids. This patient has an acute herniated disk that may or may not need surgery and should be referred to a surgeon. Oral steroids will reduce inflammation and resolve the pressure on the nerve. A radiograph or MRI of the lumbar spine is not indicated at this time under current guidelines. A radiograph will not show a herniated disk or nerve root compromise. While osteopathic manipulative treatment would be useful in this case, it is not the most important thing to do for the patient; however, it might help relieve some pressure off of the nerve root.

Reference: Harrison's Manual of Medicine, 20th ed. (2020); Ch. 50: Back and Neck Pain

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 214

ANSWER: E

The correct answer is temporalis. Temporomandibular joint dysfunctions are the result of dysfunctional coordination of the muscles of mastication (the masseter, pterygoid, and temporalis muscles) and the ligaments securing the jaw (the sphenomandibular and stylomandibular ligaments). Disorders affecting the temporomandibular joint disk and associated ligaments may also affect jaw mechanics. Since the only structure listed above that is an answer option is the temporalis muscle, this must be the correct answer. The mylohyoid attaches the mandible to the median raphe, which runs from the hyoid bone to the mandibular suture. The digastric muscle attaches the mandible to the hyoid and then doubles back to the mandible laterally. It is inferior to the mylohyoid and helps form the floor of the mouth but does not impact jaw mechanics. The omohyoid originates at the suprascapular notch and inserts on the body of the hyoid bone. It depresses and retracts the hyoid and larynx and tenses the carotid sheath. The frontalis is a muscle that attaches the frontal bone along the supraorbital ridge to the galea aponeurotica and plays no role in jaw mechanics.

Reference: American Family Physician (Jan 2023); Vol. 107, Issue 1; Temporomandibular disorders: rapid evidence review; pg. 52-58

Item 215

ANSWER: E

The correct answer is the human being is a dynamic unit of function. Trauma is both a physical and psychosocial health problem. To apply the first tenet of osteopathic medicine, one must realize that the body is a dynamic unit of function. Assessing trauma reflects this tenet by acknowledging that we are each a unit of body, mind, and spirit. Two pillars of chiropractic teaching, not tenets of osteopathic medicine, are that the goal for all care is to enhance quality of life and performance and that overall wellness can be achieved without drugs or surgery. Rational treatment should involve appropriately administered osteopathic modalities; however, this question is emphasizing diagnosis. The interrelation between structure and function speaks to further diagnosis and osteopathic assessment. It is not addressed in this question. Self-healing speaks to treatment, and this question focuses on diagnosis.

Reference: The Journal of the American Osteopathic Association (Feb 2018); Vol. 118, Issue 2; Neurobiology of sexual assault and osteopathic considerations for trauma-informed care and practice; pg. e2-e10
Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 1

Item 216

ANSWER: C

The correct answer is muscle energy to the lumbar spine. Muscle energy is a direct technique that engages muscle force to realign articular relationships and reduce pathologic muscle contractions contributing to the painful experience. This is an active older patient with nonradicular, atraumatic pain that is worse with activity. She denies any red flag symptoms. High velocity, low amplitude is a direct technique that can involve a force directed through the restrictive barrier. However, with this patient's location of pain, innominate dysfunction is less likely to be the primary source of pain. An MRI of the lumbar spine would be appropriate if there were concerns about nerve root injury or spinal cord compression from spinal stenosis. Radiography could be useful if there was a history of trauma to suggest possible fracture or if 6 weeks have elapsed. Radiography of the innominate would not be valuable, as there is no significant trauma history.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); pg. 682-684

**2024 IN-SERVICE EXAMINATION
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Item 217

ANSWER: D

The correct answer is thoracic inlet and thoracoabdominal diaphragm. The final dumping sites for the lymphatics into the venous system from all over the body, including from the colon, are the right and left thoracic ducts located within the fascia of the thoracic inlet. Addressing the thoracic inlet and thoracoabdominal diaphragm first can allow for improved lymphatic flow from the abdomen. These areas are upstream to the site of surgery, and restrictions here will impede lymphatic flow from the colon. Influence on lymphatic flow, and therefore on edema in the colon, can be obtained through many of the choices listed; however, without treatment of the thoracic inlet and thoracoabdominal diaphragm first, barriers to lymphatic flow will remain. Treatment of the OA may help in balancing parasympathetic versus sympathetic tone, which may help lymph channel tone in general. Treatment of the abdominal wall will have a direct effect on lymphatics in the immediate area, but that flow would still be impeded if blockages and restriction remain between the area and the final dumping site by the thoracic inlet. Treatment of the pelvic diaphragm may allow for easier motion of breathing, which in turn improves lymphatic flow. The pelvic floor may also help lymphatic flow by affecting the renal system, but this patient already had decent urine output. The popliteal diaphragm will stimulate lymphatic flow from the extremities but would need to overcome the respiratory diaphragm and thoracic inlet to return to circulation. Optimizing the lymphatic pathway from the final dumping site by the cervicothoracic junction and along the route toward the site of congestion is the most appropriate first step.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); pg. 915-921

Item 218

ANSWER: E

The correct answer is treat T8-T10 and release the OA. The postoperative patient may need help stimulating the gastrointestinal tract. This can be accomplished by treating T8-T10 and the OA with the goal of stimulating the underactive parasympathetic system (cranial-vagus nerve and sacral portions) and inhibiting the overactive sympathetic system (T1-L2). The small bowel is innervated by segments T8-T10. The OA release will also help address vagal tone. Laxatives and prokinetic agents will help with constipation but not with ileus. The risk of perforation from overzealous stimulation postoperatively is too high. Treatment of the upper cervical and lower lumbar spine may decrease parasympathetic tone. L3-L5 does not have autonomic contributions, so this treatment will not work and will make ileus worse. Stimulation of T5-T7 would have an effect on the stomach, liver, gallbladder, or pancreas, but not the small intestine or colon. Doming the diaphragm can improve lymphatic drainage from the abdomen but should be preceded by the thoracic inlet to allow for effective drainage. Stimulation of T12-S2 will capture the distal colon sympathetics, while the pedal pump may improve lymphatic return. However, this is likely to elicit discomfort and peritoneal signs in the postoperative patient and will not directly improve ileus.

Reference: Somatic Dysfunction in Osteopathic Family Medicine, 2nd ed. (2015); Ch. 14; pg. 145

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Item 219

ANSWER: D

The correct answer is T5 flexed, rotated right, sidebent right. The dysfunctions at these thoracic, rib, and sternal segments likely stem from the sternotomy during the patient's coronary artery bypass graft. This procedure, coupled with cessation of respiration, creates fertile ground for somatic dysfunction, even after surgery has finished. There are general principles of treatment sequence that should be followed for the successful treatment of rib cage dysfunction. As a general rule, treatment of the thoracic spine should precede treatment of the ribs, either individually or in groups. Additionally, in treating rib dysfunctions, one should address the structural rib dysfunction prior to treatment of respiratory rib restriction. Treatment of the thoracic inlet would not directly assist with the resolution of midthoracic cage pain due to a biomechanical etiology. Therefore, the correct answer is T5 flexed, rotated right, sidebent right.

Reference: Greenman's Principles of Manual Medicine, 5th ed. (2017); Ch. 15: Rib Cage Techniques

Item 220

ANSWER: D

The correct answer is physiologic hyperbilirubinemia. Physiologic jaundice occurs in most neonates from 2 to 5 days of age, making it much more common than the other options. Gilbert syndrome is a common cause of jaundice and hyperbilirubinemia in adults; however, it is a very mild type of jaundice and is not as common in the neonatal age group. Hemolysis, hypothyroidism, and sepsis are less common causes of jaundice and would likely have other associated signs and symptoms.

Reference: StatPearls (Updated Feb 2023); Neonatal Jaundice

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 221

ANSWER: A

The correct answer is a 14-year-old boy who passed out 2 times with heavy exertion going out for track. Unexplained syncope in an athlete indicates that further screening is necessary per American Heart Association (AHA) guidelines, which currently recommend preparticipation cardiovascular screening of competitive athletes based on the following criteria:

A personal history of:

- Chest pain/discomfort/tightness/pressure related to exertion
- Unexplained syncope/near syncope (judged not to be of neurocardiogenic (vasovagal) origin; of particular concern when occurring during or after physical exertion)
- Excessive and unexplained dyspnea/fatigue or palpitations associated with exercise
- Prior recognition of a heart murmur
- Elevated systemic blood pressure
- Prior restriction from participation in sports
- Prior testing for the heart ordered by a physician

A family history of:

- Premature death (sudden and unexpected or otherwise) before 50 years of age attributable to heart disease in one or more relatives
- Disability from heart disease in a close relative less than 50 years of age
- Hypertrophic or dilated cardiomyopathy, long QT syndrome or other ion channelopathies, Marfan syndrome or clinically significant arrhythmia; specific knowledge of genetic cardiac conditions in family members

Physical examination revealing:

- Heart murmur (refers to heart murmurs judged likely to be organic and unlikely to be innocent; auscultation should be performed with the patient in both the supine and standing positions [or with Valsalva maneuver], specifically to identify murmurs of dynamic left ventricular outflow tract obstruction)
- Femoral pulses to exclude aortic coarctation
- Physical stigmata of Marfan syndrome
- Brachial artery blood pressure (sitting position; preferably taken in both arms)

Most causes of sudden death in athletes are related to congenital/genetic defects, with hypertrophic cardiomyopathy leading the list. Having an overweight or obese body mass index is not a common cause of sudden death in young athletes. Seizure disorder, while potentially presenting some level of risk, would not preclude participation if controlled. Teenage female athletes may have some degree of delayed-onset menstruation, but this would not in itself present increased risk for an athlete. A single testicle likewise presents no known risk to an athlete and would have no bearing on participation in physical activity.

Reference: American Family Physician (Sep 2015); Vol. 92, Issue 5; The preparticipation sports evaluation; pg. 371-376

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Item 222

ANSWER: C

The correct answer is subscapularis. The subscapularis attaches on the medial border of the inferior surface of the scapula and inserts at the lesser tuberosity of the humerus. On contraction, it causes internal rotation and extension of the shoulder. The infraspinatus originates from the infraspinous fossa and inserts at the greater tuberosity of the humerus. On contraction, it induces external rotation. The pectoralis minor originates from the coracoid process and inserts at ribs 3-5. On contraction, it induces downward scapular motion, rotating the glenoid inferiorly and forward. The supraspinatus originates from the superficial surface of the scapula above the scapular spine and inserts at the greater tuberosity of the humerus. On contraction, it induces abduction of the humerus. The teres minor originates from the lateral border of the scapula inferiorly and inserts at the greater tuberosity of the humerus. On contraction, it induces external rotation.

Reference: Clinically Oriented Anatomy, 8th ed. (2018); Ch. 3: Upper Limb; Pectoral and Scapular Regions

Item 223

ANSWER: E

The correct answer is prescribe a 5-day course of oral corticosteroids. This patient is experiencing an acute asthma exacerbation secondary to viral illness. His baseline use of albuterol (Ventolin[®]) is once or twice per month, meeting criteria for mild intermittent asthma. The 2023 update to the Global Initiative for Asthma (GINA) Global Strategy for Asthma Management and Prevention guidelines states that step 1 treatment of adolescents and adults with mild asthma should include an inhaled corticosteroid as needed rather than a short-acting β -agonist, as this reduces the development of asthma exacerbations and the duration of symptoms. For patients on a short-acting β -agonist, such as this patient, an inhaled corticosteroid can be added to use with the short-acting β -agonist as needed for symptoms during the acute illness. Corticosteroids are antiinflammatory medications that reduce airway hyperresponsiveness, inhibit inflammatory cell migration and activation, and block late-phase reactions to allergens. Short courses of oral systemic corticosteroids are often used to gain prompt control of an asthma exacerbation, as in this patient. This patient requires an oral corticosteroid given that his peak flow is less than 60% of predicted, which indicates severe exacerbation with no improvement in symptoms in more than 48 hours. Leukotriene modifiers include leukotriene receptor antagonists such as montelukast (Singulair[®]) and zafirlukast (Accolate[®]) and 5-lipoxygenase inhibitors such as zileuton (Zyflo[®]). Leukotriene receptor antagonists are an alternative, but not preferred, therapy for the treatment of patients with concomitant allergies and asthma and do not help with acute exacerbations. Cromolyn sodium (Intal[®]) stabilizes mast cells and can be used as an alternative but is not used for acute exacerbations. Cromolyn sodium (Intal[®]) can also be used as preventive treatment before exercise or unavoidable exposure to known allergens. This patient is experiencing an asthma exacerbation, so cromolyn sodium (Intal[®]) is not appropriate. Long-acting β -agonists such as salmeterol (Serevent[®]) may be indicated for long-term control of worse disease as part of step 3 or higher; however, salmeterol (Serevent[®]) is not indicated in this patient. A macrolide antibiotic is not indicated for treatment of an exacerbation like the one described in the scenario.

Reference: https://ginasthma.org/wp-content/uploads/2023/07/GINA-2023-Full-report-23_07_06-WMS.pdf

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 224

ANSWER: A

The correct answer is borderline personality disorder. This patient most likely has borderline personality disorder. Borderline personality disorder is characterized by instability of interpersonal relationships, self-image, and affect, often combined with impulsivity. It can be associated with rapid change from idealizing caregivers to devaluing them. There is a general mistrust of health care providers. A conversion reaction occurs when a patient exhibits 1 or more alterations of voluntary motor functions or sensations that cannot be explained medically. Histrionic personality disorder is manifested by excessive attention-seeking behavior and emotionalism. Reaction formation is a type of defense mechanism in which a person acts in the exact opposite manner to their own disturbing or socially unacceptable thoughts or emotions. Sociopathic personality disorder may refer to antisocial personality disorder, in which the patient demonstrates a pervasive lack of regard for the rights of others.

Reference: Behavioral Medicine: A Guide for Clinical Practice, 4th ed. (2014); Ch. 29: Personality Disorders

Item 225

ANSWER: C

The correct answer is lipid profile. The American Academy of Family Physicians (AAFP) recommends screening patients 20 years of age and older for lipid disorders. The U.S. Preventive Services Task Force (USPSTF) recommends annual screening for lung cancer with a low-dose CT scan (not chest radiography) in adults from 50 to 80 years of age who have a 20 pack-year smoking history and currently smoke or have quit within the past 15 years. The USPSTF does not recommend routine screening with a complete blood count, liver function studies, or urinalysis.

Reference: American Family Physician (May 2019); Vol. 99, Issue 9; Cholesterol Management: ACC/AHA Updates Guideline; pg. 589-591

Item 226

ANSWER: E

The correct answer is tremor. This patient has symptoms consistent with Parkinson disease. Depression, gait disturbance, orthostatic hypotension, and rigidity appear later in the disease process and are therefore not the most common presenting symptoms in a patient with Parkinson disease.

Reference: Goldman-Cecil Medicine, 25th ed. (2016); Ch. 409: Parkinsonism; Parkinson Disease

2024 IN-SERVICE EXAMINATION CRITIQUE BOOK

Item 227

ANSWER: A

The correct answer is colposcopy and endocervical curettage. Atypical glandular cells not otherwise specified (AGC-NOS) are glandular cells that have nuclear atypia; they are abnormal but lack the features of cancer. Per recommendations, a patient needs further evaluation following a finding of atypical glandular cells on a Pap smear. The most appropriate next step in management depends on which of the 2 categories of atypical glandular cells is found. If atypical endometrial cells are found, then an endometrial biopsy is warranted. If any other type of glandular cells is found, then colposcopy to more closely examine the cervix and a possible biopsy is warranted. A loop electrosurgical excision procedure is treatment for cervical dysplasia, with which this patient has not yet been diagnosed. A referral to a gynecologic oncologist would be premature. The patient has not been diagnosed with cancer; she just needs additional preliminary screening with colposcopy and endocervical curettage. Repeating the Pap smear will only demonstrate the cytology of the abnormal cells; it is important to understand the pathology of the cells, and the only method of doing so is by colposcopy and possible biopsy with endocervical curettage. Women 35 years of age or older with AGC-NOS should also undergo endometrial sampling.

Reference: Journal of Lower Genital Tract Disease (Apr 2020); Vol. 24, Number 2; 2019 ASCCP risk-based management consensus guidelines for abnormal cervical cancer screening tests and cancer precursors; pg. 102-131

Item 228

ANSWER: B

The correct answer is oral doxycycline (Vibramycin®) 100 mg twice daily for 7 days. Historically, treatment of *Chlamydia trachomatis* infection involved a single dose of oral azithromycin (Zithromax®) at a dose of 1 g. Recent studies have shown that treatment with oral doxycycline (Vibramycin®) 100 mg twice daily for 7 days is a superior option for treatment and is now recommended as first-line therapy. For individuals who cannot tolerate this treatment strategy, oral azithromycin (Zithromax®) remains an alternative option, as well as oral levofloxacin (Levaquin®) 500 mg twice daily for 7 days. Intramuscular ceftriaxone (Rocephin®) 250 mg single dose, oral erythromycin (Mycin®) 500 mg 4 times daily for 7 days, and oral ofloxacin (Floxin®) 300 mg twice daily for 7 days are not considered first-line or usually accepted alternative options.

Reference: <https://www.cdc.gov/std/treatment-guidelines/chlamydia.htm>

Item 229

ANSWER: A

The correct answer is angiotensin-converting enzyme inhibitors. Angiotensin-converting enzyme inhibitors as a class, along with specific β -blockers (metoprolol [Lopressor®], carvedilol [Coreg®], and bisoprolol [Zebeta®]), are the only medications that have produced level A evidence for decreasing mortality and morbidity in asymptomatic patients with systolic dysfunction. Digitalis has been shown to improve dyspnea in patients with systolic dysfunction but has shown no evidence for decreasing mortality. It should be used only in symptomatic patients. Diuretics are indicated in patients with symptomatic systolic dysfunction, including edema and dyspnea. However, there is no evidence for decreased mortality. Long-acting nitrates have not been shown to decrease mortality, although they can provide symptomatic relief. Calcium channel blockers have no role in the treatment of systolic heart failure. Diltiazem (Cardizem®) and nifedipine (Procardia XL®) have been associated with increased morbidity and mortality in heart failure patients after a myocardial infarction.

Reference: Journal of the American College of Cardiology (Aug 2017); Vol. 70, Issue 6; ACC/AHA/HFSA focused update of the 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Failure Society of America; pg. 776-803

2024 IN-SERVICE EXAMINATION CRITIQUE BOOK

Item 230

ANSWER: A

The correct answer is increase lisinopril (Zestril®) to achieve a blood pressure goal of less than 140/90 mmHg. Per the Eighth Joint National Committee (JNC 8), the current goal of blood pressure control in patients with diabetes is less than 140/90 mmHg regardless of age. Therefore, the most appropriate next step is to maximize the angiotensin-converting enzyme (ACE) inhibitor (lisinopril [Zestril®]) to reach that blood pressure goal. Treatment is recommended, as the patient is not at his blood pressure goal. Similarly, lifestyle modifications and rechecking, while important, are not appropriate management steps, as the patient is not at his blood pressure goal. Decreasing the ACE inhibitor and adding a secondary agent is inappropriate, as recommendations are to increase a single medication (as long as there are not untoward adverse effects) before adding a second agent.

Reference: JAMA (Feb 2014); Vol. 311, Issue 5; 2014 evidence-based guideline for the management of high blood pressure in adults: report from the panel members appointed to the Eighth Joint National Committee (JNC 8); pg. 507-520

Item 231

ANSWER: C

The correct answer is providing emergency care for the next 30 days. While there is no firm ruling on the subject, the general consensus (and expectation of many health insurance providers) is that a discharged patient will be provided 30 days of emergency care from the date of discharge. While it is ethical to provide a reason for discharge, it can be provided in writing. A copy of the patient's chart may be furnished at the patient's request, generally for a fee, but the practice is under no legal obligation to do so. If the patient's new provider requests a copy of the patient's chart and submits the correct paperwork, a copy may be provided to their office. Unless specified by the patient's health plan, the provider is under no obligation to assist with establishing care with a new provider. The billing account of the patient has no bearing on the discharge process and does not need to be reviewed by the physician.

Reference: <https://www.medicaleconomics.com/view/removing-patient-your-practice-physicians-legal-and-ethical-responsibilities>
<https://code-medical-ethics.ama-assn.org/ethics-opinions/terminating-patient-physician-relationship>

Item 232

ANSWER: E

The correct answer is von Willebrand disease. Von Willebrand disease is an inherited condition that results from a deficiency in von Willebrand factor, which is necessary for hemostasis. It is characterized by easy bruising, mucocutaneous bleeding (such as epistaxis), and heavy menstrual bleeding. Approximately 1 out of 5 adolescents with heavy menstrual bleeding will have a bleeding disorder. In this case, with a reported family history of heavy menstrual bleeding and associated epistaxis, von Willebrand disease is the most likely etiology. Hypothyroidism can cause heavy menstrual bleeding but does not cause epistaxis, making this answer incorrect. Acute lymphocytic leukemia is also a potential cause of easy bruising or bleeding. It is typically associated with more systemic symptoms, such as fever, night sweats, lymphadenopathy, or weight loss, which are not present in this patient. Anovulatory cycles are a cause of irregular menses and heavy menstrual bleeding in adolescent patients; this patient is having regular menstrual cycles. Patients with pituitary adenomas typically present with neurologic symptoms (headache, vision changes) or symptoms of endocrine dysfunction (galactorrhea).

Reference: American Family Physician (May 2020); Vol. 101, Issue 10; Heavy menstrual bleeding in adolescents: ACOG management recommendations; pg. 633-635
Quick Medical Diagnosis & Treatment 2024 (2024); von Willebrand Disease

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 233

ANSWER: A

The correct answer is intrinsic renal disease. The finding of red blood cell casts on urinalysis is suggestive of glomerular hematuria and underlying glomerulonephritis. A urinary tract infection would show erythrocytes and leukocytes on urinalysis but not casts; a renal calculus would also show erythrocytes but not casts. Red blood cell casts on urinalysis are not a normal variant. Sickle cell disease is diagnosed by blood count and morphology, not urine testing.

Reference: Campbell-Walsh Urology, 11th ed. (2016); Ch. 1
Principles and Practice of Hospital Medicine, 2nd ed. (2016); Ch. 111: Urinalysis and Urine Electrolytes

Item 234

ANSWER: E

The correct answer is MRI of the brain and spinal cord. The concern for this patient is whether she has multiple sclerosis. Multiple sclerosis is an autoimmune disease of the central nervous system causing chronic inflammation, demyelination, and scarring. Multiple sclerosis lesions develop at different times in different central nervous system locations. It is more common in women and typically occurs between 20 and 40 years of age. The diagnosis is made if a patient has 2 or more episodes of symptoms and/or 2 or more physical signs. Common symptoms and signs of multiple sclerosis include muscle weakness, visual difficulties, and upper motor neuron signs (e.g., Babinski sign). An MRI of the brain and cervical spine that reveals focal white lesions and plaques supports the diagnosis of multiple sclerosis. Cerebrospinal fluid evaluation can also be helpful in the diagnosis of multiple sclerosis, revealing mononuclear cell pleocytosis and an increase in IgG. Electromyography measures muscle response or electrical activity in response to a nerve's stimulation of the muscle. Electromyography is indicated if there is suspicion that a peripheral nerve is compromised. Given the patient's blurred vision and weakness without specific nerve root symptoms, electromyography would not be an appropriate first-line test. A 3-phase bone scan is most commonly used to differentiate a soft tissue abnormality from a bony abnormality. The patient is not having symptoms of a bony abnormality. A CT scan of the head would not reveal multiple sclerosis plaques like an MRI. An erythrocyte sedimentation rate is nonspecific and would not be the most appropriate next step. It may be useful for the evaluation of other autoimmune diseases.

Reference: Harrison's Principles of Internal Medicine, 20th ed. (2018); Ch. 436: Multiple Sclerosis; Multiple Sclerosis; Diagnosis

Item 235

ANSWER: C

The correct answer is recommend oral vitamin D₂ 50,000 IU once weekly for 8 weeks. According to the Bone Health and Osteoporosis Foundation (BHOFF), the treatment of osteoporosis includes the optimization of vitamin D deficiency to a target blood 25-hydroxy vitamin D level of approximately 30 ng/mL or greater. Treatment is indicated for this patient at her current 25-hydroxy vitamin D level, so continuing to monitor without treatment would be incorrect. Sun exposure will not achieve the recommended level. Calcium supplementation is also recommended, but it will not also treat the vitamin D deficiency.

Reference: Osteoporosis International (Oct 2014); Vol. 25, Issue 10; Clinician's Guide to Prevention and Treatment of Osteoporosis; pg. 2359-2381
The Journal of Clinical Endocrinology & Metabolism (Jul 2011); Vol. 96, Issue 7; Evaluation, treatment, and prevention of vitamin D deficiency: an Endocrine Society clinical practice guideline; pg. 1911-1930

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 236

ANSWER: E

The correct answer is subclinical hypothyroidism. This patient's elevated thyroid-stimulating hormone level (while still less than 10.0 mIU/mL) and normal free thyroxine level with the absence of symptoms or physical examination findings support the diagnosis of subclinical hypothyroidism. While Hashimoto thyroiditis is the most common cause of overt hypothyroidism, the patient's lack of symptoms and normal free thyroxine level make this less likely. This condition would be confirmed with an anti-thyroid peroxidase antibody test. Graves disease is a cause of hyperthyroidism that typically presents with a low thyroid-stimulating hormone level and an elevated free thyroxine level. Iodine deficiency is uncommon in the United States due to the supplementation of iodine in food and would present with a low free thyroxine level. Sheehan syndrome would most commonly present in a postpartum patient with a constellation of symptoms consistent with total pituitary failure.

Reference: American Family Physician (May 2021); Vol. 103, Issue 10; Hypothyroidism: diagnosis and treatment; pg. 605-613
Medicina (Jan 2020); Vol. 56, Issue 1; To treat or not to treat subclinical hypothyroidism, what is the evidence?; pg. 40

Item 237

ANSWER: D

The correct answer is paraneoplastic syndrome. This question describes typical characteristics of both small cell lung cancer and hypercortisolism. Small cell lung cancer can cause paraneoplastic syndromes, including hypercortisolism, due to adrenocorticotropic hormone production by the lung tumor. The patient's serum glucose level and leukocyte count will be elevated secondary to increased cortisol secretion as the ectopic adrenocorticotropic hormone acts on the adrenals, and hypokalemia also favors ectopic adrenocorticotropic hormone production over primary Cushing disease. Cushing disease is possible in this case; however, with the tumor present, paraneoplastic syndrome is more likely. Symptoms of pheochromocytoma, adrenal insufficiency, and acromegaly are missing from this presentation.

Reference: Harrison's Principles of Internal Medicine, 20th ed. (2018); Ch. 89: Paraneoplastic Syndromes: Endocrinologic/Hematologic

Item 238

ANSWER: D

The correct answer is propylthiouracil (Propacil®) for the first trimester and methimazole (Tapazole®) for the second and third trimesters. Methimazole (Tapazole®) can cause birth defects, making propylthiouracil (Propacil®) the preferred antithyroid pharmacologic agent during the first trimester. However, propylthiouracil (Propacil®) has a higher risk of causing severe liver injury, so methimazole (Tapazole®) is preferred in the second and third trimesters. Both propylthiouracil (Propacil®) and methimazole (Tapazole®) have differing adverse actions that dictate which of them is the better choice for each trimester.

Reference: American Family Physician (Mar 2016); Vol. 93, Issue 5; Hyperthyroidism: diagnosis and treatment; pg. 363-370

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 239

ANSWER: E

The correct answer is primary biliary cholangitis. Primary biliary cholangitis, formerly termed primary biliary cirrhosis, primarily affects women, with a median age of 50 years. It is characterized by portal inflammation and cholangiocyte necrosis. Typical laboratory abnormalities include elevated bilirubin levels and progressive liver failure. Diagnosis is supported by a positive antimitochondrial antibody test result in 90% of patients. Typical clinical features include disproportionate fatigue and pruritus in 50% of patients; jaundice may also be present. Since this patient has typical features of pruritus, fatigue, and a positive antimitochondrial antibody test result, primary biliary cholangitis is the only correct answer. Pruritus may also occur with autoimmune hepatitis, but antimitochondrial antibodies would not be present. Banti syndrome is a congestive enlargement of the spleen due to obstruction in the portal venous system. Hemochromatosis is a condition resulting in iron overload and would not be associated with a positive antimitochondrial antibody test result. Metastatic colon cancer may present with fatigue but would be associated with a positive carcinoembryonic antigen test result rather than antimitochondrial antibodies.

Reference: American Family Physician (Dec 2019); Vol. 100, Issue 12; Cirrhosis: diagnosis and management; pg. 759-770
Harrison's Principles of Internal Medicine, 19th ed. (2015); pg. 2595

Item 240

ANSWER: B

The correct answer is acute diverticulitis. Acute diverticulitis can present with left lower quadrant abdominal pain that is often relieved by defecation; the location of pain may be anywhere in the lower abdomen due to the redundancy of the sigmoid colon. Diverticulitis can cause muscle spasms, guarding, and rebound tenderness predominantly affecting the left lower quadrant. A leukocyte count will reveal leukocytosis, and a fecal occult blood test result may be positive due to bleeding at sites of perforation. Acute cholecystitis tends to be focused in the right upper quadrant. Pancreatitis is typically associated with epigastric pain, nausea, and vomiting. Signs and symptoms of a small-bowel obstruction are abdominal discomfort, cramping, nausea, abdominal distention, vomiting, and high-pitched bowel sounds. Irritable bowel syndrome is associated with recurrent abdominal pain or discomfort with a duration of at least 3 days per month in the past 3 months associated with 2 of the following:

1. Pain is relieved by or improved with defecation
2. Onset is associated with a change in the frequency of bowel movements
3. Onset is associated with a change in the form or appearance of the stool

Reference: Ferri's Clinical Advisor 2018, 1st ed. (2018); pg. 402-403

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 241

ANSWER: B

The correct answer is *Clostridioides difficile* toxin stool test. This patient most likely has *Clostridioides difficile* enterocolitis given the sudden onset of acute diarrhea after antibiotic use. Cephalosporins are the most frequent offending agent in pseudomembranous enterocolitis because of their high rates of use. This diagnosis is made using a *Clostridioides difficile* toxin stool test. Stool culture is not useful in this scenario, as it takes too long to return a result and may not be reflective of toxicogenic *Clostridioides difficile*. A fecal elastase test can test for pancreatic insufficiency as a cause of chronic diarrhea, but that is less likely in this patient with acute diarrhea and no history of pancreatitis. A fecal calprotectin test is used to distinguish between inflammatory bowel disease and irritable bowel syndrome in patients with chronic diarrhea. An ova and parasite stool test would not be indicated for this patient without a recent travel history or risk factors for parasitic causes of diarrhea.

Reference: American Family Physician (Jul 2022); Vol. 106, Issue 1; Acute diarrhea in adults; pg. 72-80
Ferri's Clinical Advisor 2018, 1st ed. (2018); Clostridium difficile Infection; pg. 310

Item 242

ANSWER: C

The correct answer is obtain maternal blood type. This is a threatened abortion based on a closed cervix and confirmed viability in under 20 weeks. Of the options listed, the only one that is correct is to obtain the maternal blood type. Historically, all Rh-negative pregnant patients with bleeding would be recommended to get Rho(D) immune globulin at any time of their pregnancy to decrease the chance of alloimmunization, which is less than 2%. Rho(D) immune globulin can still be given in this patient, but this is somewhat controversial in the first trimester, and more clinicians are deciding against offering this treatment in patients under 12 weeks and some even into the second trimester. More data is available that quantifies the amount of fetal cells in maternal circulation this early, which is minimal and highly unlikely to cause Rh isoimmunization. Patients need to use shared decision-making with their provider about this decision, as the treatment can be given, but the risk of Rh isoimmunization is minimal and the cost is quite prohibitive as a general treatment strategy. Although physicians often prescribe bed rest, limited activity, and/or progesterone with symptoms of threatened abortion, evidence regarding efficacy in prevention is sparse and low-level. Serial HCG levels can help direct treatment options if rising as expected or not, but a solitary HCG level in isolation is not as helpful. Checking a complete blood count would be helpful as well if there were concern for significant blood loss. If the patient went on to require any type of surgery such as a dilatation and curettage, it would be appropriate and recommended to give Rho(D) immune globulin at that time, as more significant bleeding would occur versus the light spotting that is often seen in the first trimester.

Reference: Williams Obstetrics, 26th ed. (2022); Ch. 11: First- and Second-Trimester Pregnancy Loss
<https://www.contemporaryobgyn.net/view/consensus-statement-on-rh-pregnancy-testing>

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 243

ANSWER: E

The correct answer is discontinue lisinopril (Prinivil®) and begin methyldopa. Medications commonly used to treat hypertension in pregnancy are methyldopa (brand name Aldomet® has been discontinued in the United States, but the generic is still available), usually dosed from 250 to 500 mg twice daily, labetalol (Trandate®), usually dosed from 100 to 200 mg twice daily, or nifedipine (Procardia®), usually dosed from 30 to 60 mg once daily. Hydralazine (Apresoline®) is used for severe or resistant hypertension, but it would not be indicated in the management of routine hypertension in pregnancy. Methyldopa is the only medication listed that is safe during pregnancy. Angiotensin-converting enzyme inhibitors, angiotensin II receptor blockers, and furosemide (Lasix®) are contraindicated during pregnancy due to the risk of fetal malformation.

Reference: Williams Obstetrics, 26th ed. (2022); Ch. 53: Chronic Hypertension
Drugs (Mar 2014); Vol. 74, Issue 3; Drug treatment of hypertension in pregnancy; pg. 283-296

Item 244

ANSWER: C

The correct answer is 65-year-old man with a 6-week history of neck pain that has not responded to over-the-counter medications. An otherwise healthy older adult may benefit from muscle energy or other gentler techniques in the absence of any contraindications. Muscle energy is contraindicated in children and adults who cannot follow instructions reliably; therefore, a 2-year-old patient and a patient with severe cognitive impairment would not be the best candidates. A 22-year-old woman who everted her ankle and presents with localized bruising and swelling would suggest an acute injury and perhaps a fracture. As such, muscle energy would also be relatively contraindicated. A 75-year-old thin-appearing woman with a 2-month history of nighttime rib pain, unexplained weight loss, and no known injury may have undiagnosed metastatic disease or fracture from osteoporosis; therefore, muscle energy would be contraindicated until further workup is completed.

Reference: Foundations of Osteopathic Medicine, 4th ed. (2018); Ch. 34; pg. 797-812

**2024 IN-SERVICE EXAMINATION
CRITIQUE BOOK**

Item 245

ANSWER: E

The correct answer is taper off alprazolam (Xanax[®]) over the course of 6 to 10 weeks or longer, initiate a selective serotonin reuptake inhibitor, and follow up in 1 week. Prescription medication addiction/overuse can frequently be managed via outpatient therapy. It is recommended that patients on long-term benzodiazepines slowly taper the dose of the medication they were taking by 25-50% every 1 to 2 weeks for 6 to 10 weeks and for some patients several months. It can take 6 months or more to gradually taper certain patients off benzodiazepines after chronic use. It is individualized by patients and their response. Frequent follow-up and support is necessary throughout the taper period so that adjustments can be made if needed. Inpatient therapy is seldom necessary for withdrawal from prescription medications in a motivated patient unless severe withdrawal symptoms are experienced. While it is recommended to continue attending Narcotics Anonymous (NA) meetings, stopping high-dose benzodiazepines immediately without additional medical therapy is likely to cause significant withdrawal, including nausea, vomiting, irritability, anxiety, psychosis, or even seizures. Selective serotonin reuptake inhibitors take up to 4 weeks to reach maximum effectiveness for treatment of anxiety. During this time period, the benzodiazepine taper should be started. The answer options with no benzodiazepine taper are incorrect. It is acceptable to switch to a long-acting benzodiazepine such as clonazepam (Klonopin[®]) and to gradually taper the dose; however, given the amount of alprazolam (Xanax[®]) this patient has been using and the duration of overuse, this rapid of a taper is unsafe even if switching her to clonazepam (Klonopin[®]) and could precipitate significant withdrawal symptoms. Psychiatric consultation is wise if choosing to place a patient with a history of prescription medication misuse on long-term benzodiazepine treatment. There is some concern that longer tapers can prolong dependency, but continued gradual reduction is the overall goal, so it can still be successful. Participation in counseling with a counselor experienced in addiction medicine is important. Participating in a recovery support group such as NA can improve the potential for success. Withdrawal symptoms are minimized when medications are slowly tapered and the underlying psychiatric condition is appropriately managed.

Reference: <https://americanaddictioncenters.org/benzodiazepine/how-to-taper-off-benzodiazepines>
<https://www.uptodate.com/contents/benzodiazepine-withdrawal>
<https://www.uptodate.com/contents/benzodiazepine-use-disorder>